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THE UNIVERSITY OF ALBERTA

THE GIFTED IN SCHOOL:
DOES SEX MAKE A DIFFERENCE?

by

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A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF EDUCATION

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Gifted in School: Does Sex Make a Difference?" submitted by Marian Adele Stelmaschuk in partial fulfillment of the requirements for the degree of Master of Education.

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ABSTRACT

This study was designed to identify and examine existing differentials in the patterns of ability and achievement between a group of gifted males and females in the Edmonton Public School system in order to determine whether or not their respective achievements replicate the sex-typed patterns found to exist in general student populations. A total of 432 students (240 males and 192 females) ranging from grade six through to grade twelve were selected for the study on the basis of several criteria: (1) that they were, or had been, involved in the Edmonton Public School Board Gifted Program at some point in time during the past five years and (2) that they were still enrolled in one of the system schools.

Data was collected primarily from two sources: (1) student cumulative records and (2) Edmonton Public School system test and measurement records. Analysis of achievement and ability test scores was conducted separately for the elementary, junior and senior high school cohorts although between-group comparisons were also made to the extent that they were possible.

The study was exploratory and descriptive in nature and sought only to describe the respective patterns of ability and achievement of the students within the sample and did not seek to generalize to a wider population. Given the ex post facto nature of the study, statistical differences were not sought because of the inherent difficulties of control in secondary data analysis. Furthermore, randomization within the sample was not possible because of the relatively small number of students at each of the grade levels considered.

The majority of students were of higher SES origin with slightly more than two-thirds being from professional and/or managerial homes.

Differences in SES origins between gifted males and females were small.

Examination of the enrollment figures for the years during which E.P.S.S. Gifted Programs were operational showed that males consistently outnumbered females in gifted programs at both the elementary and junior high school levels although a trend was established towards a more equitable distribution of males and females, most notable in the years post 1976.

With respect to the differentials in the patterns of ability and achievement between gifted males and females, the findings were inconclusive. With the exception of the findings that all males performed better in Math/Science relative to their own performance in Language Arts/Social Studies and that proportionately more males than females scored in the lowest grade score categories in all subject areas, no other findings were generalizable to the gifted aggregate. The inconsistencies between cohorts and the relatively small differentials between male and female achievements at the various grade levels led to the conclusion that there were no sex differences in either ability or achievement between the males and females who had been identified for gifted programming.

Analysis of the respective ability patterns for the gifted cohorts raised a number of significant questions regarding the identification criteria and selection procedures used for gifted programs. The lack of constancy in IQ test scores over the growth cycle for a large percentage of gifted males and females challenged the continued use of a "fixed" IQ criterion of 130 as well as the use of the label "gifted" to designate students with high academic potential.

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CHAPTER I

INTRODUCTION

Although the study of sex differences has received considerable attention during the past decade, there have been relatively few studies investigating the differences between gifted males and females, i.e. those individuals who have been identified as the most intelligent, talented and outstanding within society. Because research on the gifted has generally been concerned with the totality, it has seldom differentiated between gifted males and females. As Fox (1977: 113) has noted, "studies of gifted children have typically ignored sex differences", with the result that gifted males and females have been assumed to be relatively similar in both their abilities and achievements. This, in turn, has resulted in their being subsumed under the definitional label of "gifted" with little recognition that there may be different influences and/or experiences mediating in their respective achievements. Though there has been the recognition that gifted children are not all alike and that they differ in personality, interests and achievements, there has not been the recognition that some of these differences may be sex-linked. Consequently, one is led to believe that gifted males and females resemble each other in patterns of ability, achievement, interests and styles of learning.

Hopkinson (1978: 110) indicates that there is sufficient evidence to suggest that there are differences between gifted males and females yet ... "the one profoundly disturbing aspect ... is the apparent conspiracy of silence about them". Though he acknowledges

the fact that in general, there is a lack of research on the differential learning styles and abilities of males and females of all ability ranges, he feels that "in the case of the most able, the neglect of these matters is particularly marked and particularly serious". (1978: 110-111) Newland (1976) similarly identifies the study of gifted males and females as an area requiring further research although he sees it as only one of the many areas within gifted education requiring additional investigation.

My experience of working with gifted students over a number of years within the Edmonton Public school system appears to support Hopkinson's suggestion that differences between gifted males and females tend to exist. Daily interactions reveal that there are differences in attitude towards school work, quality of performance, behaviour, play activities, interpersonal relationships as well as differences in interests and enrollment ratios. Scientific interests seem to be well-developed in gifted boys as early as grade one or two whereas gifted girls seem to be more interested in the arts, crafts and other "feminine" subject areas. Though some girls express considerable interest in scientific concerns, their interests and aptitudes do not appear to be as precocious as the boys. In addition, few boys show as great an interest as the girls in music, art, creative writing and poetry. Though the boys read extensively, they tend to choose "male" types of books, i.e. sports, science fiction, adventure, mystery, history and general science. Similarly, individually chosen research topics demonstrate sex-typed subject preferences. However, whether or not their respective school achievements and/or intellectual abilities are also sex-typed requires empirical

investigation.

With respect to sex differences in intellectual functions and academic achievements within general populations, it has been found that girls, though usually better performers than boys in overall academic achievement, tend to consistently outperform the boys in school subjects emphasizing the verbal/communicative types of skills, i.e. spelling, reading, grammar, language, literature and the various social sciences. Boys, on the other hand, tend to consistently outperform the girls in school subjects emphasizing the mathematical/abstract reasoning types of skills, i.e. mathematics, problem solving, science, biology, geography and the other "hard" sciences. (Maccoby and Jacklin, 1974; Tyler, 1974; Fox, 1977; Williams, 1977; Sherman, 1978) It has also been found that differential achievements tend to be most pronounced during adolescence at which time the differentials between the mean achievement scores for males and females are most notable. (Maccoby and Jacklin, 1974) Moreover, these particular achievements appear to be directly related to the differential cognitive aptitudes which have been found to define male and female modes of cognition (Witkin, 1962, 1967; Maccoby and Jacklin, 1974; Sherman, 1978), these being:

(1) that males tend to excel in visual spatial abilities

(2) that males tend to excel in mathematical abilities

(3) that females tend to excel in verbal abilities

Fox (1977) however, cautions against generalizing these sex differences and achievement trends to gifted student populations.

Differential interests and sex-typed subject preferences as observed between gifted males and females in Edmonton's gifted program classes may not necessarily translate into sex-typed patterns of ability and achievement. It may very well be that gifted males and females exhibit similar aptitudes and demonstrate similar achievement patterns over their respective growth cycles. If this is the case, then the treatment of gifted males and females as a homogeneous group as has been done in the past is perhaps warranted. Unfortunately, there are too many gaps in our knowledge about gifted students in general to state definitively what their respective ability and achievement patterns are. Few significant advances have been made in furthering existing knowledge in the area; hence, educators tend to be guided by the dated research findings from the Terman years.[1] Because the gifted constitute a minute proportion of a given student population (estimated at approximately the top two - five percent), their numerical scarcity, confounded by the highly political problems of identification and definition, makes them an uncommon object for extensive research analysis and consequently, few such groups are readily identified and made available for study, especially in Canada. Therefore, the extent to which the findings of general male/female differential achievements can be applied to gifted males and females remains basically unresolved and in need of investigation.

Statement of the Problem

It is the purpose of this study to examine the respective abilities and achievements of gifted males and females within the Edmonton Public

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[1] See Chapter II of the thesis for a historical perspective and a brief summation of Terman's contributions to gifted education.

School system. Specifically, the study seeks to identify and examine the differentials in their patterns of ability and achievement in order to determine whether or not their respective achievements replicate the sex-typed patterns found to exist in general student populations. The questions directing this study are as follows:

(1) Is there a difference in the proportion of males and females identified as "gifted" at the varying grade levels throughout the EPSB? Is this particular male/female ratio similar at the elementary, junior and senior high school levels?

(2) What is the general level of academic achievement of this group of gifted students? Does the level of achievement remain fairly constant over the years or does it increase/decrease as the students progress to the higher grades?

(3) Is there a difference in regular school performance between males and females and is this difference consistent regardless of subject area? That is, is there a difference between male and female achievement in Language Arts? in Math/Science? Do the females tend to perform better than the males in Language Arts and the males better than the females in Math/Science?

(4) Is there a difference in standardized test achievement between the gifted male and female groups? Is this difference consistent over the years or does the differential widen/narrow between the sexes as they progress to the higher grades?

(5) Is there a difference in measured ability test scores between the gifted males and females? Are these differences in ability consistent or do ability test scores increase/decrease over time? Are there any patterns common to both gifted males and females?

(6) Are these patterns of ability and achievement similar for all gifted males and females across all grade levels, i.e. are there characteristic patterns defining the elementary, junior and senior high groups of gifted students?

Overview of the Thesis

Because the reasons underlying the relative neglect of the study of sex differences between gifted males and females are significant and demand elaboration, they will be examined briefly in Chapter II not only to put the present research study into proper perspective but also to underline its inherent limitations. In essence, these reasons encompass the major macro-systemic issues highlighting the problems of the gifted, issues which are fundamental to a comprehensive understanding of the entire area and which explain why micro-studies such as the present one are relatively few.

Chapter III will provide a critical review of the literature on sex differences of both gifted and general student populations and will thereby form a more comprehensive theoretical base from which to interpret the findings of the study.

Chapter IV will provide a brief discussion of the various research procedures utilized in data collection and analysis whereas Chapter V will discuss the findings of the study. Chapter VI will summarize these findings and will consider their implications for further research as well as for policymakers in terms of selection procedures for gifted programming.

CHAPTER II

FACTORS UNDERLYING THE NEGLECT OF RESEARCH OF GIFTED MALES AND FEMALES

This chapter is organized into four sections with each section devoted to a discussion of one of the major reasons underlying the neglect of research in the area. The first section discusses the problematic nature of all sex difference research although only the main points will be highlighted since Chapter III deals extensively with these issues.

The second section overviews the IQ question which has direct relevance for this study and which has implication for the identification and definition of the gifted. Because gifted education has been embroiled in the "nature-nurture" controversy since its very beginnings, the problems of IQ testing and their social and political implications cannot be ignored in a study such as this.

The third section considers the changes in the conceptualization of "giftedness" and "intelligence" whereas the last section considers the problems involved in the operationalization of the definitions. Together, these four major factors have resulted in an uncertainty as to who the gifted really are and consequently, in an inadequate body of knowledge on the gifted.

The Problematic Nature of Sex Difference Research

The neglect of the study of sex differences within gifted populations can partially be explained by considering the reason for the general neglect of sex differences in all social and/or psychological

research since even in general populations, it has not constituted a major source of research activity until very recently. In fact, it has only been since the late 1960's and 1970's that investigators have begun to seriously consider the differences between the sexes as areas worthy of extensive research. Prior to then, sex differences and sex roles had been taken for granted, i.e. they had not been seen as problematic, and whatever differences had been found to exist between the sexes had been seen as biologically patterned and therefore not subject to question. As a result, researchers had generally tended to ignore sex differences and had not sought to explain what appeared to them to be natural and inevitable.

Furthermore, most of the research had been performed by male researchers who tended to prefer male to female subjects on a two to one ratio resulting in a disproportionate amount of attention and research consideration to male concerns. (Williams 1977: 383) More important than this, and perhaps more critical, had been the use of male standards and/or measures to which female performance had been compared and as Williams (1977: 383) has stated, "not infrequently when women had been included in research samples, their performance had turned up inexplicable sex differences which constituted an anomoly to the existing theory".

Taken together, these reasons suggest that a pervasive male bias has tended to dominate all previous research into human behaviour. This dominance in scientific inquiry has had the effect of dictating the nature and the extent of research study into various problem areas with the result that in general, women have been omitted from most social and/or psychological theories. In the few instances in

which they have been considered, they have been seen as appendages to the male species and/or as wholly irrelevant to the articulation of the social structure. However, with the recent challenges posed by the Women's Liberation Movement regarding female equality and the immutability of sex roles, these theories have begun to be criticized for being inadequate because of their neglect of women, for operating from outmoded scientific paradigms and/or for being methodologically unsound. (Bardwick, 1971; Maccoby and Jacklin, 1974; Bernard, 1975; Weisstein, 1977 et al) Research findings have similarly been challenged on the grounds that they have been based on questionable assumptions, findings which have proven to be mere self-filling prophecies and which have done little more than describe the existing state of affairs.

The ultimate effect of the struggle for equal rights has been to shatter the traditional myths about female inferiority and to demystify other beliefs about males and females. As a consequence, there has begun to be a reformulation and reassessment of previous assumptions and an accelerating pace of investigations into the nature of sex differences and the extent of sex-role stereotyping in the schools.

However, the significant advances which have been made in the restructuring of attitudes and beliefs regarding the differences between males and females in general populations have not been matched in the area of gifted populations. There has been neither the proliferation of studies nor the same degree of interest. Even though there have been few studies examining sex differences within gifted populations, this number, when compared to that in general research areas, represents a minute and relatively inconsequential concern.

This neglect derives from the general neglect of gifted populations themselves. They are not, nor have they ever been, a popular source of scientific inquiry and the literature makes this readily apparent. A review of the literature yields an improverished and "distressingly spotty" body of knowledge (Newland, 1963: 481) and one which has had relatively few new discoveries since the 1920's. (Gowan, 1977: 18) Not only is it marked by a discontinuity in the development of theory and research but also by a lack of focused directionality and consensual orientation. Furthermore, it is characterized by inaccurate terminology and inconsistent criteria by which gifted populations have been identified and consequently, it is unable to direct further study and thereby to facilitate the comparability of findings. This inadequacy is described rather appropriately by Newland (1963: 481) who states that,

> "Even though the area of the gifted can boast of the only truly longitudinal study of exceptional children and a few other outstanding ones of lesser scope, the bulk of the studies have resembled rifle shots, or ill-aimed shotgun blasts rather than well-thought-out firing patterns".

It is not at all surprising, then, to find that the study of sex differences in gifted samples has been neglected when the entire area itself has been neglected.

The Problem of IQ

A. A Historical Perspective

The major reason underlying the lack of development of theory and the failure of investigators to generate new research into the area of the gifted is a product of the highly political and

controversial issue of "intelligence" and encompasses the IQ question and intelligence testing. The consequent tentativeness with which educators have approached education for the gifted is a reflection of the uncertainty and the changing attitudes of what constitutes "intelligence", how it develops and how it is to be measured.

Historically, gifted education has always been intimately associated with intelligence testing and it is this link, with its inherent political ramifications, which has proven to be the bane of its existence. There has been and continues to be an assumption that "giftedness" is synonymous with a high IQ and that gifted individuals are those scoring high on intelligence tests. Moreover, this assumption is predicated upon another assumption - that "intelligence" is a unitary and fixed type of ability which is amenable to measurement and prediction.

The awareness of the gifted and the subsequent need to identify them for educational purposes had its genesis in the 1920's and was an outgrowth of the intelligence testing movement in the United States at the time. Fathered and nurtured by Louis Terman, a psychologist at Stanford University, the Gifted Child Movement and its basic conceptual orientations had been derived from the findings of his study of approximately 1500 intellectually gifted children - a longitudinal study spanning twenty-five years of these individuals' lives and one giving to educational theory the rudiments of a theory of "giftedness".

Following on the heels of Sir Francis Galton, a statistical genius who had felt that men could be classified according to their abilities, Terman revised and "americanized" the original Binet scale of mental ability and applied it to measure the "intelligence" of

individuals. He was one of a group of psychologists who believed that "intelligence" was inherited, that it was a fixed, unitary type of ability which could be measured. Thus for him, mental testing was merely a method of sampling the mental processes which he saw as central to the study of individual differences as well as the "interrelation of mental traits, mental growth, the limits of educability and the psychology of genius, mental retardation and insanity". (Seagoe, 1975: 112-113)

After considerable research, testing and refining, his Stanford-Binet Intelligence Test was published in 1916 with the result that "for a great portion of the present century, intelligence had been considered to be what a Stanford-Binet measures". (Gowan, 1977: 12) Terman thus came to be associated with the introduction of the IQ test as a measure of innate intelligence as well as the notion that the gifted constituted the upper limits of the normal distribution curve. According to him, approximately one-half of one percent (.5%) of the population would score within the gifted range (140+) on the Stanford-Binet although current practices now include those with IQ scores of 130 and up.

Prior to Terman's time, it had been believed that gifted persons were eccentric, bookwormish, sickly and/or socially maladjusted - "usually psychotic or otherwise abnormal and almost sure to burn themselves out quickly or to develop postadolescent stupidity" (Terman, 1954: 10) - an image which had been popularized by such nineteenth century writers as Lombroso and Nisbet who had demonstrated in their own studies of genius that insanity and genius were closely and inextricably linked. This belief had been furthered by other studies of genius as

well as being reinforced by living examples of brilliant men who had "gone mad". However, Terman's study of gifted individuals had changed this image and, according to Barbe (1965: 1) "no intelligent person today believes that genius and insanity go hand in hand". A new image had successfully replaced this older image. All linkages between genius and insanity had been totally refuted and the gifted had now become the exact opposite - "the epitome of everything teachers and parents would want". (Maker, 1977: 7) According to Terman, (1954: 11) the "gifted" were ...

> " ... in general, appreciably superior to unselected children in physique, health and social adjustment; markedly superior in moral attitudes as measured either by character tests or by trait ratings; and vastly superior in their mastery of school subjects as shown by a three hour battery of achievement tests. In fact, the typical child of the group had mastered the school subjects to a point about two grades beyond the one in which he was enrolled ... his ability is so general, as to refute completely the traditional belief that gifted children are usually one sided".

To define the "gifted" in another way, they were the academically talented individuals - the ones who were verbally as well as socially and emotionally superior to their chronological age peers, i.e. they were generally superior individuals in all facets of human development and contrary to former beliefs, their superiority tended to persist throughout adulthood. (See Terman, Havinghurst and de Haan.) Furthermore, these gifted individuals could be identified on the basis of a single psychometric on a Stanford-Binet Intelligence test.

Based on his earlier studies on genius, Terman insisted that gifted children be identified early in their youth and that they be

nurtured through special educational programming to fulfill the promise that had been indicated by their intelligence test scores. As he argued,

> "What I especially want to emphasize, however, is that both the evidence on early mental development of historical geniuses and that obtained by follow-up of gifted subjects selected in childhood by mental tests point to the conclusion that capacity to achieve far beyond the average can be detected early in life by a well constructed ability test that is heavily weighted with the "g" factor". (1954: 15)·

He also advocated that the term "gifted" be used to designate this group of intellectually precocious youth in preference to the nineteenth century term "genius". According to him, this latter term seemed to set this group of individuals apart from the rest of the population and because he saw them as "simply an extreme on a scale of intellectual ability continuous with everyone else", (Seagoe, 1975: 87) he chose to use the term "gifted" to refer to the high IQ child. Though his reasoning was consistent with the prevailing belief system regarding the nature of "intelligence", his assumption that "intelligence" permitted rank ordering of individuals and that "giftedness" constituted high achievement on an IQ test remained problematic.

Neither his definition nor his views on special programming for the gifted gained widespread acceptance in all educational and/or political circles. The implementation of special educational programming for a very select group of children, identified on the basis of some arbitrary and socially constructed criterion, appeared to defy the Jeffersonian liberal democratic ideals and to challenge its very principles. (Whipple 1924; Rice, 1970) Consequently, a program which

seemingly belied these principles and which suggested that some individuals were innately more "gifted" than others and that their talents were more valued, appeared to be incompatible with the political ideology of the day. Controversy and emotions raged over these special facilities for the gifted and as Whipple (1924: 146) remarked,

> "a hasty conclusion that gifted children should be taken aside and given an education of a peculiar kind is bound to arouse hostility because so many people look to the graded school as an indispensable instrument of democracy".

Hostility and opposition to programs for the gifted seemed to be directed primarily at the use of the IQ test and its inherent assumptions. One vocal critic at the time, Bagley (1922) felt that though differences in native mentality could not be denied, it should be recognized that IQ scores could vary, that they could be significantly altered by changing one's environment and that the level of intellectual functioning could be raised through education. Another outspoken critic and contemporary of Terman, Walter Lippman, claimed that there was no evidence that such tests measured intelligence or anything related to the problems of real life. He agreed that the tests identified a certain kind of ability but he felt that calling that ability "intelligence" in the broadest sense was absurd. (Lippman, 1922:4-13; Seagoe, 1975: 114) His skepticism of the IQ test's ability to measure "intelligence" was expressed in the following way:

> " ... the claim that we have learned to measure hereditary intelligence has no scientific foundation ... the claim that Mr. Terman or anyone else is measuring human intelligence has no more scientific foundation than a hundred other fads,

> vitamin glands, and amateur psychoanalysis and other correspondence courses in will power and it will pass with them into that limbo where phrenology, palmistry, characterology and the other Babu sciences are to be found". (1922: 28)

Though spoken in the 1920's, those same criticisms have resounded over the past sixty years and still continue to do so. Then, as now, the critics of the intelligence testing movement felt that the IQ test was a dangerous and unsound scientific tool and that it was a threat to democratic ideals. They feared that the assumption that "intelligence" was fixed and unchanging would be used to classify people in order to determine one's social status and to determine who went to the universities and the various trade schools. Ultimately, they feared that the use of the IQ test would lead to a crystallization of the stratification system thereby "closing" the society and the opportunities for social mobility - consequences which were in opposition to the tenets of democratic society.

Proponents of IQ testing, on the contrary, saw it as the quintessence of democracy. They felt that by grouping individuals on the basis of their so-called innate abilities, individuals would receive the maximum opportunities to develop their potentialities to the fullest. They believed that individual differences were inherited and that "intelligence" was fixed; therefore, they felt it was to the individuals' benefit, as well as to society's, that individuals be trained and allocated into those social positions which were commensurate with their native abilities. As far as they were concerned, the social class structure was merely a reflection of the manifest differential abilities of individuals, with the most

intelligent individuals naturally occupying the most prestigious social positions and reaping the greater share of the material rewards.

Their unshaking faith in the IQ test as a valid measure of "intelligence" and in its use for the betterment of society was expressed by Terman with the publication of the IQ test ...

> " ... in the near future, intelligence tests will bring tens of thousands of these grade defectives under the surveillance and protection of society. This will ultimately result in curtailing the reproduction of feeble-mindedness and in the elimination of an enormous amount of crime, pauperism and industrial inefficiency. It is hardly necessary to emphasize that the high grade cases, of the type now so frequently overlooked, are precisely the ones whose guardianship it is most important for the state to assume". (1916: 6-7)

The consequences were many. The deification of the IQ test during the 1920's and 1930's had far reaching effects and eventually gave way to the type of social and political abuse that the critics had feared - the ultimate consequence being that the IQ test had "served as an instrument of oppression of the poor - dressed in the trappings of science rather than politics". (Kamin, 1974: 16) What had made it a particularly potent instrument was that it had been pioneered during a time in which the "zeitgeist" in western society was racist and nativistic and in which it was fervently believed that not only intelligence was inherited but also the various social ills - crime, pauperism and mental defectiveness. As Eysenck (1973: 25) explained, during those times ...

> "there was a close connection between social science and what passed for genetics, it was widely believed that mental illness, feeble-mindedness, criminality and other deviations from normality resulted from abnormalities

> of the brain and central nervous system, and, being physiological in origin, were determined largely by hereditary causes".

Together, this belief system and the existence of a scientific test which purported to screen the normal from the abnormal and the brilliant from the not-so-brilliant resulted in large numbers of mentally defective, poor and criminal being tested and subsequently placed in state and/or county institutions on the basis of their IQ scores. Furthermore, sterilization laws were encouraged by the Eugenicists, and in fact, passed in some states to prevent these "grade defectives" from reproducing and transmitting their bad genes to future generations. (Kamin, 1974; Eysenck, 1973; Block and Dworkin, 1976) Other social agencies as well used IQ tests as screening devices with schools allocating children into particular ability tracks at the various grade levels - some into academic streams, others into terminal and/or vocational programs - and the military allocating men into particular occupational ranks suitable to their "native" intelligence.

This latter use of intelligence testing had been the first utilization of group IQ testing for massive screening purposes. At that time, it had been urged by Dr. Robert Yerkes who was the Director of the American Psychological Association in the hope that the results would aid in the job classification of draftees. (Kamin, 1974: 32) Not only was this accomplished but the results of the testing also conveniently provided the scientific "proof" that the American negroes, Mexicans, Latin Americans and the people from Southern Europe were inferior to those of the Northern races, a finding consistent with the doctrines of social Darwinianism which were in vogue at the

time. These findings were then used by the government of the day to establish immigration quotas ... "designed to exclude the biologically inferior D and E peoples ..." (Kamin, 1974: 46) from entering the United States in order to keep North Americans racially "pure" as possible.

The uses - and abuses - of intelligence testing during those early pioneering years engendered intense debate and fueled the "nature-nurture" controversy ultimately giving rise to the Environmentalist school of thought and to new theories of "intelligence" and its etiology. Accompanied by the "zeitgeist" of the times, these years of intelligence testing had done their damage and were, as Eysenck (1973: 25) called them, a "monstrosity". What had made them particularly horrific was that the pro-nordic, anti-semitic, and anti-negro attitudes had not only been accepted by extreme hereditarians but had also been widely acclaimed by academicians and scientists. Because of the all-pervasive strength of the tenets of Social Darwinianism during those early years, people had been classified and categorized according to their manifest abilities and intelligence came to be defined as a unitary type of ability which was convergent and cognitive in nature and which was amenable to psychometric measurement. Simultaneously, the IQ test had become the sacred instrument by which this innate "fixed" potential could be measured and by which "giftedness" could be identified. Both intelligence and the term "gifted" had thereby assumed a rather limiting perspective of human abilities and, as Getzels and Dillon (1977: 97) had stated,

> "The ability with which the term came to be associated was intelligence, but circumstance rather than logic, encouraged the widespread

> identification of giftedness with intellectual talent alone. It was the development of the intelligence test and its vigorous use in an early influential study of genius (Terman, 1925) that combined to give this conception of intellectual giftedness its central place in education and psychology".

In essence then, what resulted from these years of intelligence testing was the creation of an ideology of "IQism", i.e. a belief system which perpetuated the notion that "intelligence" was what an IQ test measured and that it was genetically determined. Furthermore, it assumed that the most intelligent individuals naturally gravitated towards the highest SES positions and that the social structure was a natural and inevitable consequence of differential human abilities. The tenets of "IQism" were consistent and compatible with the meritocratic political ideology of the liberal democrats and the social functionalists who basically maintained that,

> "In a society in which tasks are specialized, some of these tasks call for talents which are rare, or are found more abundantly in some individuals than in others. It is necessary that the more talented be attracted to those occupations which require their skills. These occupations demand administrative, entrepreneurial, military or intellectual skills which are vital to society. While anyone can perform unskilled tasks only the talented can perform certain skilled ones; consequently, such tasks must earn higher material and prestige rewards than others; and often they also involve the exercise of greater power". (Cohen, 1968: 59)

"IQism" thus located one's ultimate success and/or failure within the individual himself and attributed any differences or inequalities to genetic differences. Consequently, a causal relationship was seen to exist between IQ ("intelligence") and SES, one which was reductionist in nature and one which Herrenstein (1971: 58) felt was so obvious

that it could be stated in syllogistic form:

(1) If differences in mental abilities are inherited, and

(2) If success requires those abilities, and

(3) If earnings and prestige depend on success,

(4) Then social standing (which reflects earnings and prestige) will be based to some extent on inherited differences among people.

These assumptions, however, remained problematic. None had been totally accepted by the academic or the lay community and though hundreds of studies had been generated into the effects of the different social variables upon IQ and educational attainment, they had not managed to restructure the ideological frameworks nor to change the attitudes regarding the nature of man and his abilities. Consequently, the "bucket theory of intelligence" tended to persist despite evidence to the contrary, and continued to dominate the organization and practise of educational programming. Accordingly, the IQ test continued to be used to measure "how large a bucket the particular student had" (Erickson and Brookover, 1969: 8) with little realization that the notion of fixed and limited capabilities was outdated and no longer acceptable.

Notwithstanding the many criticisms which had been directed against the use of the IQ test and the realization that environmental factors played a significant role in test outcome, the continued use of the IQ test seemed to reinforce and legitimize this "IQism" and eventually gave rise to a renewed and intensified resurgence of the racist and hereditarian doctrines of the past. This recent rebirth of biological

determinism had largely been precipitated by the failure of the massive social reforms of the 1960's to ameliorate the conditions of the poor and the disadvantaged, particularly by the failure of compensatory educational programs to raise the IQ levels and to maintain academic achievement. Reformers had reasoned that if the early educational experiences of culturally deprived children could be made more motivating and enriching, then theoretically, their IQ scores would increase and correspondingly, so would their school performance. However, the provision of such experiences through programs like Head Start basically failed to do this. IQ levels increased temporarily for some students but they gradually declined over time.

Prompted by the failure of schools to modify IQ scores, Jensen assembled whatever evidence he could on the heritability of IQ (primarily twin and parent/child IQ studies) and launched a major attack on egalitarianism/environmentalism. In his provocative article, "How Much Can We Boost IQ and Scholastic Achievement?" (1969), he came to the conclusion that they could not be raised much at all. The fact that IQ levels remained relatively low for these culturally disadvantaged children plus the fact that high correlations existed between parent/child IQ's and between twins reared in different environments had to mean that innate potentialities imposed limits on the extent to which environmental experiences could modify IQ test scores. Thus, according to him, IQ was highly heritable and environmental effects could only account for approximately twenty percent of the variance. The remaining eighty percent was due to one's genetic endowment; therefore, IQ levels could not be improved beyond these genetic limits. The fact that blacks consistently scored fifteen points lower than whites on

IQ tests implied that they were genetically inferior to whites. The implicit racism and sexism of his thesis touched off intense controversy, not unlike that of the 1920's and 1930's.

Bowles and Gintis (1972) challenged Jensen's genetic interpretation and underlying assumptions of "IQism". They argued that IQ was, in actual fact, irrelevant to economic success and equality of opportunity. They suggested that "IQism" legitimized rather than generated the social stratification system and that the strong, positive relationships existing between IQ, educational attainment and SES merely served to reinforce and facilitate the perpetuation of the ideology and the status quo. In other words, it was a mechanism of social control. According to them, IQ, SES, and educational attainment contributed independently to the individual's ultimate success and contrary to traditional beliefs, IQ was the least important factor. This meant that the most intelligent individuals did not necessarily achieve the highest SES positions and that the system was not as meritocratic as it was assumed to be. Instead, access to these social positions was dependent upon a set of non-cognitive variables which included a number of preferred personality traits such as motivation, ambition, self-discipline, task-orientation, internalization of work norms and orientation to authority as well as the necessary educational credentials and "proper" ascribed racial, sexual and age characteristics. Schools played a vital role in the legitimization of this "IQism" not only through the granting of educational credentials to those students who possessed this defined set of variables for access to the elite but also through the socialization and reconciliation of students to their future

stations in life via the "hidden curriculum" and "cooling out" processes.

Criticism of the genetic interpretation also took the form of methodological challenge. The many influential IQ studies which had been done by Cyril Burt and which had formed a major part of the genetic argument were found to be fraudulent. (Kamin, 1974; Eysenck, 1977) Essentially, Burt had been accused of falsifying his statistics and of perpetrating one of the greatest frauds of the century. In some studies, he had neglected to indicate which IQ tests he had used, when he had used them and who his subjects had been. In other studies, he had merely estimated and not actually measured the IQ's of his subjects. In still others, the number of subjects varied yet the IQ scores for these subjects and correlations were exactly the same, even to the same decimal point. Contradictions in his data, purportedly obtained from the same samples, were frequent. Even the existence of his co-researchers was questioned.

All in all, his studies had violated the rigour and documentation required of scientific inquiry and as a consequence, they had been totally discredited by the scientific community. The validity of the genetic argument had been seriously undermined. Eysenck (1977: 24) concluded that Burt's misdemeanour and cavalier treatment of the data was inexcusable for a scientist. However, he was not totally convinced that the genetic argument had been seriously impaired by Burt's fraudulence since he felt that there was sufficient evidence from other studies to support and strengthen the genetic argument. On the other hand, Kamin (1974), who had analyzed a number of other influential research studies on IQ correlations besides those of

Cyril Burt (i.e. the Newman, Freeman and Holzinger study; the Shields study and the Skodak and Sheels study) felt that the assumption that IQ was inherited was unsupported by the evidence although he indicated that this conclusion was "silent with respect to another possible question". As he elaborated, "there may well be genetically determined differences among people in their cognitive and intellectual 'capacities'. To demonstrate this, psychologists would have to develop test instruments that provide adequate measures of such capacities. They have not as yet done this; they have only developed IQ tests". (Kamin, 1974: 226)

B. The Problematic Nature of IQ Tests

Kamin could not have been more explicit. According to him, IQ tests did not measure cognitive and intellectual capacities - a conclusion which has been acknowledged by many researchers and psychologists over the years. Rather than measuring "intelligence" as has previously been assumed, they more effectively and accurately measured other human qualities than they did "intelligence". As Block and Dworkin (1976: 450) suggested:

> "people with equal intelligence may differ in knowledge and skills because of differential access to cultural information due to difference in vocabulary and knowledge; presence of books, magazines, and newspapers in the home and the quality of local schools; differences in the parental encouragement of intellectual and scholastic activities; desire to appear cultured or to do well in school, anxiety about culture or school; attentiveness ... but insofar as IQ reflects the differences in opportunity, interest and so on, over and above intelligence, the tests measure opportunity, interest and so on, rather than intelligence".

Eysenck (1973: 63) as well, suggested that perhaps what has

been more accurately measured has been one's "mental speed, error-checking and persistence or continuance" - a suggestion which has more than a kernel of truth to it since in a testing situation, students are expected to do a certain number of items within a given time limit. In order for them to achieve well on the IQ tests, they have to have the motivation to do well; they have to be interested in completing the test items; they have to have sufficient background knowledge to answer the questions and they also have to be test-wise. Furthermore, particularly on group tests, they have to be able to read the questions and to interpret them properly. Children with perceptual, reading, behavioural and/or motivational problems will naturally have more difficulty in completing the set number of questions within a given time frame and will therefore score lower than they would have under different circumstances. Consequently, IQ tests have been biased against those children having social, learning and/or emotional problems as well as being biased against those not part of mainstream middle America. As a result, IQ tests have not necessarily sampled the actual potential and/or "intelligence" of testees because of the handicaps under which they may have been functioning.

Given the wide variety of factors which may ultimately influence test outcome, researchers have concluded that IQ tests tend to measure "differences in cultural background, parental encouragement, attitudes towards school attentiveness, speed, ability to concentrate, persistence, tendency to check for errors" (Block and Dworkin, 1976: 453) as well as the capacity to deal intelligently with the problems of the classroom. But whether or not they are accurate guages in measuring or predicting a student's ability or "intelligence" to cope

with the problems of real life is questionable and remains problematic. Critics therefore, question the use of the term "intelligence" test when in fact, IQ tests are not tests of "intelligence". They are more appropriately measures of book-learned knowledge and attitudes towards academic success and are best seen as scholastic aptitude and/or school achievement tests. Implicit then in their challenge is the extent to which IQ tests and "intelligence" are correlated, an issue which has resulted in extreme skepticism over the use of IQ tests and which has remained as intensely polarized as it has been in the past.

> " ... on the one hand are those who think that the tests are altogether worthless, or at best, only relevant for white, middle class subjects. On the other hand, are those who believe that they constitute the most accurate measures of learning abilities yet devised". (Holden, 1978: 555)

C. Relevance to Gifted Populations

The implications of the IQ challenge for the study of the gifted are clear. If IQ tests measure "opportunity, interest and so on, rather than intelligence" (Block and Dworkin, 1976: 453) and if, by definition, gifted children are those scoring high on intelligence tests and are selected solely on the basis of their IQ test scores, then are gifted children merely those who have had the greatest opportunity for personal development and the highest expressed interest in school rather than those who are the most "intelligent"? Are these identified gifted children really "gifted"?

The answer in part seems to be found in the research findings of investigators who have studied gifted populations in the past although these findings are only suggestive and cannot be conclusive. They have found that gifted children tend to be primarily of higher SES

origin, to come from achievement-oriented homes in which both parents are highly educated and usually engaged in professional occupations, to be generally of Anglo-saxon, German or Jewish parentage, to be almost all native-born, to be physically stronger and healthier than children of more average "intelligence", to be either first-born and/or the only children in the family (although there is a high incidence of both children in a two sibling family being identified as gifted) and to engage in many extra curricular activities (Terman, 1925; Drews 1963; Durr, 1960; Barbe, 1965; Goldberg, 1965 et al) - social variables which have all been found to be positively correlated with higher SES.

Table 2.1 demonstrates the percentage of students which is generally expected to be found at the various IQ levels in the different SES groups. The fact that approximately forty-five to sixty percent of the students in a higher SES community compared to only sixteen to twenty percent in a lower SES community score above 115 further suggests the possibility that high IQ and/or "gifted" children may merely be artifacts of middle class socialization. As De Haan and Havinghurst (1957: 7-8) have observed, "talent, as ordinarily defined, is heavily concentrated in urban, white middle-class groups".

Taken together, these findings challenge the identification criteria and selection procedures used by the respective school systems in order to identify gifted students. As will be discussed in Chapter III, these identification criteria have effectively served to discriminate against individuals of the lower classes and/or ethnic minorities as well as against females. Thus, the gifted have tended to be primarily white, Anglo-saxon, middle class males with few representatives from the other groups in society contributing to their numbers.

Table 2.1*

APPROXIMATE PROPORTIONS OF SCHOOL POPULATIONS
AT VARIOUS INTELLECTUAL LEVELS

Stanford-Binet Intellectual Levels	Percentage of School Population: Average Community	Percentage of School Population: Superior Socioeconomic Community
IQ above 140	.5 - 1%	2 - 3%
IQ above 130	2 - 4%	6 - 12%
IQ above 125	5 - 7%	15 - 20%
IQ above 120	10 - 12%	30 - 40%
IQ above 115	16 - 20%	45 - 60%

*The above table is reproduced from Gallagher, James, "The Gifted Child in Elementary School". In Dennis, W. and Dennis, M. (Eds.), The Intellectually Gifted: An Overview, New York: Grune and Stratton, Inc., 1976, p. 121.

Conceptual Shifts in Definition

The sharp criticisms which were raised against the excesses of the intelligence testing movement during the early years as well as the well-documented relationships which were found to exist between IQ, SES and educational/occupational achievement eventually gave way to a redefinition of "intelligence" and consequently, of "giftedness". In turn, these conceptual shifts were reflected in a change in the type of educational programs offered by the respective provincial and state boards of education and in the educational philosophies underlying curricular implementation. In total, these changes in conceptualization and in practical application suggest another reason for the paucity of research in the area of gifted populations.

Moreover, the study of the gifted has merely been a small part of the larger gestalt of human behaviour - a part which has met with considerable disfavor by sociologists, educators and politicians alike - and any major shifts in the conceptualization of human nature and of "intelligence" have naturally affected the conceptualization of "giftedness", i.e. the conceptual shifts which have occurred in the definition of the "gifted" have been a function of the conceptual shifts within the larger gestalt of human behaviour. As Gowan (1977: 18) has stated,

> "The Gifted Child Movement is not really a discipline at all but merely an applied area of measurement of individual differences. It is hence the development section of a larger gestalt, which embraces theory and procedures for creative development of all the talents of mankind. It is consequently, not complete in itself and is best understood merely as the educational application consequent of new ways of looking at the development of talent".

Essentially, these "new ways of looking at the development of talent" have meant a broadening and an expansion of the concepts of "intelligence" and of "giftedness". Intelligence was no longer being seen as a unifactorial type of ability. It was now being seen as multifactorial with as many as 120 different abilities identified as constituting the totality of one's intelligence. (Guilford, 1959). This particular concept of "intelligence" had extended and elaborated Thurstone's notion (1938) that intelligence had eight component parts (verbal, number, spatial, rote memory, perceptual speed, word fluency, inductive and deductive reasoning) and for the first time, the creative thinking skills (productive thinking skills) were being seen as important aspects of the intellect. The theory of intelligence had thus moved from one in which "intelligence" was seen as unifactorial as originally postulated by Spearman and Thorndike at the turn of the century, to one in which "intelligence" was multifactorial (Thurstone, 1938) and in turn, to one in which "intelligence" was viewed more holistically including all the mental processes thought to be involved in ideational production.

Similar advances were made in the conceptualization of the way in which "intelligence" developed. Instead of seeing "intelligence" as a "thing", i.e. as a "constant" which was fixed and/or pre-determined by heredity, theorists were seeing it as a function of the individual organism's symbolic interaction with its environment. According to this view, "intelligence" was non-fixed, ever changing and evolving dialectically through the individual's interaction with his environment. Intelligence thereby developed through a process of continual adaptation to the various stimuli which the individual encountered and experienced

- a process in which experiences with the environment were necessary, although not sufficient, for the development of "intelligence". Furthermore, it was the individual himself who motivated and stimulated his own learnings. Since he had the ability to discriminate between stimuli, he was thus able to attend to those which he perceived to be vital to his own development. However, the stimuli to which he attended were also limited by the particular stage of development at which he was functioning, stages which were more or less determined by maturational factors. In other words, the individual was able to incorporate only those aspects of the environment with which he had previous experience and for which he had developed mental structures. In the constant process of accommodating and adapting to the stimuli to which he was exposed, he was able to "construct" his own reality and thus guide and regulate his own intellectual development. (See Piaget, 1969; Erikson, 1950 and Bruner, 1966) In this sense, intelligence was a process of continual adaptation to the environment and therefore negated the possibility of measurement since it was constantly in a state of change. To quote Vernon (1969: 16),

> " ... we no longer think of intelligence as a definite entity or power, an autonomous mental faculty, which simply matures as children grow up. It has to be conceived rather in terms of a cumulative building up of more complex and flexible 'schemata' (Piaget's term) or what Miller, Galanter and Primbram call 'plans', through the impact of the growing organism and the environment on one another. These schemata depend upon the active exploration and experiment by the former, and on arousal and reinforcement by the latter, and they are formed and organized by use".

Thus, the most recent theories regarding the development of intelligence had departed from the preformist traditions of the past

and had introduced a symbolic interactionist perspective in which both the organism (nature) and the environment (nuture) were actively involved in the development of the intellectual functions. In this particular view then, "intelligence" could never have limits since it was constantly in the process of evolving as the individual adapted to his immediate environment. One's "intelligence" could be increased by increasing one's experiences and exposure to new and novel environments and as McV. Hunt (1961, 1968) has suggested, by applying Piaget's theories of child development, the intelligence of the average child could be raised by as much as thirty IQ points. Vernon (1969: 16) however, has qualified Hunt's suggestion by adding, that in order to do so, "incalculable social and emotional changes among parents" would also be necessary.

According to this view, therefore, inter-individual differences would occur because of differential experiences and differential levels in the modes of intellectual functioning. If an environment was not motivating and was, instead, restrictive and monotonous, then the child would not be stimulated to seek out new challenges and to build upon existing cognitive structures. Consequently, individuals needed novel experiences and constant challenges in order to advance their mental functioning to the higher stages of intellectual growth.

These subsequent changes in the theoretical conceptualization of "intelligence" which have had implication for changes in the conceptualization of "giftedness" have been succinctly summarized by Gowan (1977: 9) ...

> " ... high intelligence and gifted children, is characterized by a change from unifactor to multifactor views of intelligence, from seeing the gifted child as having a super-

> normal IQ to seeing the gifted as a pool for potential creativity, and from a concept of intelligence as mechanistic and consisting of cognition and memory to a concept of intellect as emphasized by transformations, implications and a more creative consciousness".

These changes in conceptualization are evidenced in the following definitions of the "gifted" spanning the sixty years since the genesis of the Gifted Child Movement in United States. Not only do they reflect the changes in the theoretical stances regarding the nature of "intelligence" and "giftedness" but also the changes in the valuation of skills/abilities which policymakers have felt deserved the designation of "giftedness".

> " ... the ability to make a high score on such intelligence tests as the National, the Terman Group and the Stanford-Binet". (Terman, 1925: 631).

> " ... the talented or gifted child is one who shows consistently remarkable performance in any worthwhile line of human endeavour". (Witty, 1962: 36)

> " ... an able or gifted child is one whose rate of development with respect to time on some personality variable of <u>agreed social value</u> is significantly larger than the generality". (Gowan and Demos, 1964: 7)

> " ... gifted children shall be defined as those children who consistently excel or show the potential to consistently excel above the average in one or more of the following areas of human endeavour to the extent they need and can profit from specially planned educational services:
>
> 1) General intellectual ability
> 2) Specific academic aptitude
> 3) Creative thinking
> 4) Leadership ability
> 5) Visual and performing arts ability
> 6) Psychomotor ability
>
> (Educational Consulting Associates, Inc., 1977: 35).

The Problem of Definition

Arising from the problematic nature of the IQ and "intelligence" testing as well as the resultant conceptual shifts in defining "intelligence" and "giftedness", the operationalization of the concept of "giftedness" has constituted a major problem for most educators and school systems. This problem of definition, therefore, constitutes another important reason affecting the development of theory and research in the area.

Today, most writers would agree with Carroll and Laming's (1974: 85) statement that "despite the efforts of numerous researchers, defining giftedness appears to be a timeless problem". Given the lack of consensus, one finds that identification criteria vary from researcher to researcher and from school district to school district. There are no consistent measures being utilized in the identification of gifted students although the majority of school systems still use the out-dated, out-moded unifactorial definitions and IQ criteria of the Terman years. (Khatena, 1978) Consequently, the high IQ child still tends to be seen as the gifted child and educators, by being steadfast in their use of the IQ test as the criterion of giftedness, continue to perpetuate the myth of "IQism".

Summary

The term "gifted" has defied accurate description. The social and political implications of the definition and the attempts at educational intervention for gifted students have evoked intense emotional debate and disagreement on whether or not programming for the "gifted" should be offered. "Giftedness", however defined, is

problematic. By defining "gifted" in one way, certain skills and/or abilities are selected out as being more valued than others and in so doing, other talents and abilities are discriminated against. It is this concern which has resulted in a wide range of criteria of giftedness being used by various school systems and in the "on-again, off-again" interest expressed by researchers in the area of the gifted.

The most important questions, therefore, remain those surrounding the identification and the definition of the "gifted". Who really are the "gifted"? Are the current identification procedures akin to "card-stacking" where the teacher's subjective evaluations, combined with the culture-loaded IQ tests serve to select out superior examples of middle class socialization practices rather than those students who really are "gifted"?

In summary, the problematic nature of gifted education has been long-standing and the definitional problems arising out of the IQ question have been the primary reason for the failure of researchers to develop a more comprehensive and thorough body of knowledge about gifted student populations.

CHAPTER III

REVIEW OF THE LITERATURE

This chapter will provide a critical review of the literature which forms the theoretical framework for the current study. In reviewing the literature, related findings from both areas in question - the gifted and sex differences - will be examined in order to better integrate the literature which is directly applicable to the research problems. Given the problematic nature of sex difference research, this review will take into consideration the criticisms which have been made of the various research findings and their consequent validity in explaining differential abilities and achievements. Because attitudes and social conditions have changed considerably over the past decade, many of the earlier findings may no longer be valid. They may have been true and descriptive of certain populations at a given time but there is no reason to assume that the same findings will still be true today. Consequently, the "time-bound" nature of the studies is recognized and the findings cautiously interpreted.

The chapter is organized into three major parts with the first part providing a general review of the specific sex differences which have been found to exist between males and females in intellectual functioning and academic achievement. This part will include several subsections, these being:

(1) Male/female ratios in gifted populations
(2) Differences in general intelligence
(3) Differences in the stability of IQ test scores
(4) Differences in cognitive styles

(5) Differences in verbal/spatial abilities

The second part of the chapter will provide a general overview of the problematic nature of sex difference research and in so doing, will briefly examine the debate which is currently focused upon the development of sex differences. The last part of the chapter will look at the etiology of sex differences through an interactionist perspective and the role which sex-role stereotyping plays in the development of gender-identities and subsequently, of differential abilities and achievement.

I

Research Findings

Male/Female Ratios in Gifted Programs

In considering the differences between males and females in intelligence and IQ test scores, a difference emerges which has direct relevance to gifted programs and to this study in particular. There is the assumption that males, as an aggregate, are more dispersed over the ability ranges than females. According to this view, females are clustered around the middle of the normal distribution curve whereas males have a larger number of extreme deviants at both ends of the scale. These deviants purportedly account for the differential mean achievements between males and females and for the larger standard deviations in the distribution of male scores. This "greater variability hypothesis" dates back to Thorndike (1906) who came to the conclusion that males had a greater variability in intellectual capacities, a conclusion which he had based upon Cattell's study of the thousand most eminent intellects in history in which

ninety-seven percent were male.

This particular hypothesis seems to have been supported by the larger number of male deviants in institutions for the retarded as well as the larger number of males reportedly in gifted programs and/or research studies on gifted populations. However, as Anastasi (1958: 456) and Tyler (1965: 249) indicate, this greater male variability is the result of differential selection procedures and differential opportunities for the attainment of eminence. The hypothesis today has largely been discredited as a plausible explanation for the differential attainments of men and women. (Wittig, 1976)

Since one of the problems of this research study is to examine the sex ratios in the Edmonton Public School Board's Gifted Program, this particular section will explore fairly extensively the male/female ratios which have been found to exist in gifted programs and/or studies on gifted children. The majority of research studies have primarily been concerned with gifted populations as a totality and as a result, few have provided statistical information regarding the frequency distribution of the sexes. Those which have reported male/female ratios tend to show that there are significantly more males than females in gifted populations thereby seeming to support this "greater variability hypothesis".

The first major and influential study on intellectually gifted children which seems to have established and confirmed the belief that there are more male than female geniuses is Terman's Genetic Studies of Genius (1925). Out of a total of 1,528 students selected from several Californian cities during 1921, Terman and his research

assistants found 857 males and 671 females (or 54.1% male and 43.9% female) who achieved IQ scores within the range considered "gifted", i.e. 140+. This total figure included 1,070 elementary school students (577 or 53.9% male and 493 or 46.1% female) who were selected on the basis of individual Stanford-Binet IQ test scores. The remainder of the group - those at the high school level - were selected on the basis of scores on the Terman Group IQ test. Within this latter group, there was a much higher sex ratio, "roughly 160 boys to 100 girls". Seagoe (1975) suggested that this was probably due to the less systematic procedures in locating gifted students in the high schools although it is also possible that the higher male ratio at the high school level was due to the fact that during that period of time, education for women was not as highly valued with the consequence that fewer women actually attended high schools in those early years. Their smaller numbers would automatically decrease their chances of being equally represented in the gifted high school sample.

Furthermore, another factor which could have influenced the sex ratios is the impact of Social Darwinianism on the existing belief structures. Since women were seen as intellectually inferior to males, it is possible, and not at all unreasonable, to assume that the girls were overlooked by their teachers in the identification and selection of gifted individuals. Because the teachers were the ones who initially screened the gifted candidates for Terman's study, they may have been guided by their beliefs about the presumed genetic inferiority of females. This may have resulted in the lower numbers of females in Terman's group of gifted students.

On the basis of his study, subsequent IQ testing results and a

survey of sex differences on the variability of the sexes on intelligence tests, Terman found that "29 out of 33 sex comparisons based on age groupings showed greater variability of boys". (Terman and Oden, 1959: 54) This meant that there were more males scoring within the gifted IQ range as well as more males scoring within the dull normal range. Interpreted another way, it also meant that there were more male "geniuses" than there were female; consequently, it was to be expected that there would be more males identified for gifted programming.

This finding seems to have been replicated time and time again and psychologists have thus been led to believe that males vary in natural abilities considerably more than females. As Robb (1976: 143) has stated:

> "it is consistent with my experience not only in this aspect of education but also in the field of mental retardation that there are more boys than girls to be found at both extremes of the scale of ability ..."

Numerous studies appear to reinforce these beliefs. One of the first major studies following Terman's was one done in Scotland in 1936. 874 elementary students were given the Stanford-Binet and the researchers found that, "the S.D. of the IQ distribution for this perfect sample was 15.9 for boys and 15.2 for girls - a difference sufficient to give a sex ratio of 134 boys to 100 girls scoring as high as 140 IQ". (Terman and Oden, 1959: 54)

Kincaid (1963), in a study of 561 elementary gifted students from kindergarten to grade six whose IQ's were 150+, found a sex differential favoring males. He found that there were 331 (or 59%) males compared

to 230 (or 41%) females in his sample. Norman, Clark and Bessemer (1962) replicated these findings with their sample of 215 gifted grade six students drawn from 5,000 sixth graders in Albuquerque, New Mexico. They found a differential of 16.2% favoring males - 125 (or 58.1%) males compared to ninety (or 41.9%) females. Enrollment figures for Pittsburgh's elementary Gifted Program (1956-57) likewise indicated a higher male ratio - 51.7% (or fifteen) males compared to 48.3% (or fourteen) females. Another Gifted Program, Western Carolina's College Elementary Gifted Program, reported a sixty-three percent male participation ratio compared to a thirty-seven percent female ratio over a four year period although the ratio varied somewhat from year to year. (Bixler, 1964) In each year reported, there were proportionately more males than females in the program with the respective participation ratios recorded as follows:

Year	Male	Female	Total
1958	17 (58.6%)	12 (41.4%)	29
1959	19 (63.3%)	11 (36.6%)	30
1960	22 (70.9%)	9 (29.1%)	31
1961	18 (60%)	12 (40%)	30

Lovell and Shields (1967) too, found a significant sex differential in their sample of gifted students. They reported a ratio of 2.33 males to one female or thirty-five (seventy percent) males to fifteen (thirty percent) females. However, their sample size, like most of the other studies cited, was extremely small and the resultant sex differential may consequently have been exaggerated.

In a more recent study, a significant differential favoring males was once again found by Hitchfield (1973). Out of a total of 238

seven year old gifted students selected for the study, 125 (or 52.5%)[9] were male and 113 (or 47.5%) were female. However, what makes this study particularly interesting are the means by which the students were chosen - selection procedures which seem to provide empirical support for the earlier suggestion that beliefs and attitudes regarding the intellectuality of the sexes play a major role in the identification of the gifted for programming and/or research. Some students were chosen for the study on the basis of a high test score on the Goodenough Draw-A-Man Test (a test in which students are simply asked to draw a man and in which scores are based upon the student's accuracy of observation and conceptual development). Other students were chosen on the basis of high achievement scores on reading and mathematics as assessed by teachers and tests. The last group of students were chosen from a larger group that had been identified as gifted by their parents. (Parents had been asked to write the National Children's Bureau if they felt they had a gifted child, a request which had been advertised in the British magazines, the Press and the BBC.)

The results of the final selection of gifted children speak for themselves. More girls were selected on scores achieved on the Goodenough-Draw-A-Man Test (a creative test utilizing abilities in which girls generally demonstrate a greater superiority); there was an equal number of boys and girls selected on school achievement test scores but interestingly enough, there were approximately two and a half times as many boys identified as gifted by their parents as there were girls. The table on the next page demonstrates the actual breakdown of males/females selected for the study. (Hitchfield, 1973: 9)

Criterion for Selection	Boys	Girls	Total
1. Draw-A-Man Test	38	47	85
2. Attainment	50	50	100
3. Parent's Recommendation	37	16	53
	125	113	238

Hitchfield indicated that the request for parental identification drew 103 replies with a total of fifty-three students being selected for the study from this number. However, as she claimed, "in the letters from parents' group, there were twice as many boys as girls. This reflected the general pattern from the whole batch of replies". (1973: 9) She explained the reason for this in the following way,

> " ... this might mean that the incidence of giftedness, is higher among boys than girls or that from the parents' point of view, boys are more readily recognized as gifted, or perhaps more highly valued if they show ability, than girls". (1973: 11)

This suggestion that parents more readily recognize their sons than their daughters as "gifted" is wholly consistent with current value systems. With few exceptions, males are accorded the highest value and status in society. Whether it is a stated preference for a male child, or whether it is a value-judgement that an article, book and/or product is better because it is male-produced, there is the implicit assumption that males are the superior and more valued sex. Since intellectuality and academic success are seen as stereotypic male attributes, they are encouraged in males, discouraged in females and hence, more easily recognized when manifest in males. However, this particular aspect will be elaborated upon in greater detail in a later part of the chapter when socio-cultural explanations are

considered.

Thus far, the studies cited have sampled only elementary gifted students with the exception of Terman's study. The general conclusion reached regarding the preponderance of males in gifted programs still holds at the junior and senior high levels with one significant change - the differentials widen between the sexes with the males participating in significantly greater numbers than females. Just as Terman's sex differential favoring males was found to be greater at the senior high levels, the same finding holds true of the more recent gifted programs and/or research studies on the gifted. (Fox, 1974; Keating, 1976; George and Solano, 1976; Fox, 1977) Consequently, the sex differential favoring males increases as both males and females increase in age although it should be noted that the majority of the current programs at the higher grade levels tend to be almost exclusively of a mathematics/science orientation and/or acceleration variety. Therefore, the wide gap between male/female ratios is not unexpected. As George (1976: 246) points out:

> "Boys tend to outnumber the girls in these classes on the average of 2 to 1 or 3 to 1 because girls don't perceive Mathematics as a field readily accessible to them".

Only two studies were found which were contrary to these general findings. One was a study done by Jenkins in 1935 on a group of grade three to eight negro students. He found a ratio of 2.33 to one favoring girls - a differential which he attributed to the early advantages that girls appear to have during the early years of schooling. The

other study was one conducted by Wm. R. Nash (1973-74) on a group of grade four students enrolled in a Gifted Program at River Oaks School in Houston, Texas. He found that there were thirty-five (or fifty-three percent) females and thirty-one (or forty-seven percent) males participating in the program - a somewhat smaller ratio than Jenkins' finding but one which nonetheless indicates that girls are more readily identified as bright in the primary elementary grades than they are in the later grades. Generally, it is assumed that the early verbal superiority of girls permits both the teachers and parents to perceive them as being brighter. As a consequence, they may be more frequently selected for gifted programming in the earliest years of school although programming is seldom offered at this level.

There is one other study worthy of note and one which raises many significant questions. Torrance and Mourad (1978) reviewed a "Future Problem Solving Program" sponsored by the University of Georgia and offered in twenty-four different states for gifted youngsters. Approximately 1,729 students, ranging from grade three to grade twelve, participated in the various programs. All participants were chosen according to the multi-dimensional definition of "giftedness", i.e. one incorporating creativity. Torrance and Mourad found that the "sex distribution was approximately equal at all levels". (P. 181) One is consequently led to ask whether the groups of gifted children were purposely selected to ensure a relative equality between males and females; whether more females were included because the broader definition of "giftedness" encompassed the type of skills/abilities in which they tend to excel or whether the sex ratios were equal because of a heightened awareness of the

fact that females constitute a source of talent and ability. Only with the male/female participation ratios from successive years will one be able to determine whether or not a trend towards greater participation of females in gifted programming has been established.

To summarize, the majority of studies cited in this section show that there is a tendency for more males than females to be identified for gifted programming. The few exceptions to this general finding are those studies primarily concerned with the lower elementary grades, i.e. the years during which girls decidedly have an advantage over boys. However, given the fact that teacher selection has constituted the major mode of identification for programming and/or research and that the majority of these studies have been conducted prior to 1970, it is quite conceivable that the selection procedures had been greatly influenced by traditional belief systems (i.e. the superiority of the males) and by the different social values and expectations placed upon academic success for males and females respectively. Though difficult to validate empirically, it is a plausible explanation and one which seems implicated in recent research into sex differences as well as the recent findings of Torrance and Mourad (1978) on the sex ratios in the University of Georgia gifted programs. Consequently, the general tendency for males to have predominated in programs for gifted students in the past does not necessarily prove a higher incidence of giftedness in males but rather may reflect the differing opportunities and expectations placed upon achievements for males and females by society.

Getzels and Dillon (1977: 120) summarize this position well ...

> " ... that under present conditions ... there are more male geniuses, and there are also more male criminals, mental defectives, suicides,

> stutterers, and color-blinds. It is evident that men have been both more prominent and more numerous than women in areas of high achievement, but they have been so by reason of differing opportunities rather than differing abilities".

Differences in General Intelligence

In terms of "general intelligence" as measured by IQ tests research has consistently found that there are no significant differences between the sexes and that whatever differences exist are extremely small and insignificant. In some studies, boys have been found to score slightly higher in average IQ than have girls, usually on those tests depending largely on spatial aptitudes; in others, girls have scored higher in average IQ than have boys, usually on tests in which verbal skills have been emphasized. In general, then, researchers have concluded that there are no sex differences in overall IQ although they are agreed upon the verbal superiority of females and the visual/spatial superiority of the males. (Anastasi, 1958; Tyler, 1974; Stewart, 1976; Kolesnik, 1969; Fox, 1977; Vernon, 1977; Sherman, 1978)

However, this finding is not as meaningful as it first appears to be since IQ tests have been constructed to eliminate any sex biases and thereby negate the possibility of finding any reliable sex differences. In the process of developing IQ tests, items which have been found to be particularly difficult for one sex have been excluded and other items which have been found to favor one sex more than the other have been balanced with an equal number of items favoring the other sex. As Kolesnik (1969: 101) states, "it is a foregone

conclusion that the average IQ of a group of boys will be about the same as that of a group of girls. If it is not, there might be reason to suspect that there is something 'wrong' with the test".

Since this is the case, the more conclusive position is one suggested by Kipnis (1976: 99) who states,

> "Whether the sexes differ in general intelligence is uncertain. In practise, whether or not sex differences in intelligence exist can only be tested through the administration of tests which were deliberately developed in such a way as to minimize the likelihood of obtaining sex differences".

Stability of IQ Test Scores

Given the fact that IQ tests preclude the existence of sex differences in terms of global test scores, it would seem that they also deny the existence of any meaningful differences between males and females and therefore, do not warrant further consideration. Moreover, their questionable nature seems to accentuate the meaninglessness of IQ test results in examining male/female differences. However, when one examines the IQ test results obtained over the respective growth periods of males and females, one finds that they do indeed show important and significant differentials.

In general, the IQ scores for girls tend to decline relative to those of boys during adolescence, i.e. between the ages of ten - sixteen, whereas boys tend to maintain their IQ scores better than girls regardless of the level of ability. In many cases, boys actually increase and/or show gains in their IQ scores over the years. (Bayley, 1955; Bradway and Thompson, 1962; Terman, 1954; Maccoby and

Jacklin, 1974; Tyler, 1974; Stewart, 1976; Boocock, 1972; Campbell, 1976)

These same general trends seem to be true also of gifted populations as well. Gifted girls tend to regress towards the mean of the general college population more than gifted males although gifted populations, in general, tend to maintain relatively stable IQ's well into adulthood. (Terman, 1947; Owens, 1953; Terman and Oden, 1954; Miles, 1954; Bayley, 1955; Maryland, 1973)

The general explanation for this regression in IQ scores for girls and constancy and/or gain for boys centres upon the nature of adolescence in Western society with its unusually demanding expectations for sex-role adherence. These are the years when bodily changes assert themselves and when society demands and expects conformity to the traditional sex-role behaviours, undoubtedly the only time during an individual's life when the pressures are as great for sex-typed behaviours. As a consequence, differential achievements between boys and girls are attributed to the throes of adolescence and their subsequent attempts to establish self-identities in which their gender identity constitutes one of the most important aspects. Lavach and Lanier (1975: 218) explain this generally weaker performance of girls during the adolescent years as follows:

> "in competing with boys, many adolescent girls anticipate negative consequences of success, and although these are high achieving girls who understand the importance of doing well in school, many of them feel success in school could bring negative personal consequences. As they progress through school girls face increasing social pressure to conform to traditional sex roles. During these years of transition from the

> upper elementary grades where girls compete freely with boys, through the junior high years where girls become increasingly aware of the negative social aspects of intellectual success to the senior high years where many girls exhibit the motive to avoid success ..."

Or, to put it another way, girls are not supposed to be "smart". According to tradition, boys are presumably smarter than they are and consequently girls learn to downplay their "intellectuality" in order to appear "feminine" and not to challenge the traditional male/female stereotypes. They are actively discouraged from pursuing traditionally male-dominated careers, particularly those in the Math/Science areas, by parents, counsellors, teachers and society at large. Though there are exceptions, for the large majority of girls the various socializing agencies effectively socialize them into rejecting long-term academic/intellectual pursuits with the consequence that they pursue relatively short-term training to keep themselves occupied until they marry and raise a family.

This particular attitude of "anti-intellectualism" which is held about female achievement is well demonstrated by Fox's finding that some gifted girls purposely repeat courses to avoid acceleration. (1977: 125) In essence, they "play dumb" so as not to challenge the boys' masculinity since they realize that brilliance, particularly in male-dominated fields, is not a valued female trait. Numerous other studies similarly show that girls tend to hide their intelligence because they do not want to appear too bright and thereby lessen their chances of being socially acceptable.

One fairly recent study on changes in IQ for male and female

adolescents seems to support these general findings. Campbell (1976), based on a study of 471 high school students (290 females and 181 males) in four different New York schools in rural, urban and suburban areas, found that both males and females experienced a change in IQ scores. Boys experienced an average gain of 1.62 IQ points and the girls, an average decline of 1.33 points. The mean IQ score for the boys in grade seven was 106.8 compared to 108.4 in high school whereas the mean IQ score for the girls in grade seven was 110.8 compared to 109.5 in high school. However, it is questionable whether a mere 1.62 and/or a 1.33 point differential over a period of four to five years constitutes a significant increase/decrease in IQ scores. Given the nature of IQ test scores and their known variability under different test conditions, these findings may or may not be valid and therefore generalizable to other populations. However, Campbell concludes that her findings agree with the general findings of the past and that there is a general tendency for girls' IQ scores to decrease during adolescence and for boys' IQ scores to increase.

When considering the actual number of students experiencing IQ gains and/or losses, she found that 33.2% of the boys increased in IQ points while 29.0% of the girls declined. 22.1% of the boys declined in IQ scores as well - a 5.9% difference between male and female decliners. She also found that both male and female decliners tended to drop about as many IQ points although in general, the decliners tended to be of higher IQ ability than non-decliners. In relation to this finding, she found that girl decliners maintained a slight edge on the boy decliners in that their IQ scores remained higher than those of the boys. No indication was given whether or not the girls

increased in IQ scores or how many improved over time. Since only twenty-nine percent declined from their grade seven test scores, seventy-one percent of the girls either did not change or else their IQ scores similarily increased.

Furthermore, no apparent controls were utilized in the research design; consequently, it appears that students of varying abilities, backgrounds, motivations, and experiential knowledge were treated as a relatively homogeneous group. In addition, two different IQ tests were used in the determination of mean IQ scores - the Otis Quick Scoring and the Lorge Thorndike. Even though individual students wrote the same IQ test in high school that they had written in grade seven, three of the high schools in the sample had administered the Otis Quick Scoring and the other high school had used the Lorge Thorndike. Despite the fact that these two different IQ tests had been used, the results of the IQ tests were aggregated and treated as if they had all been based on the same test. Since each IQ test has a different ceiling for the different age levels, comparability of IQ test scores and the consequent determination of an average IQ score for the total group becomes problematic. It is highly unlikely that there is a perfect correlation between the two tests and that a score of 130 on one test will equal a score of 130 on the other.

Though an equipercentile method can be used to work out equivalency tables for the different tests, there is no indication that this was done in the study. Thus it is difficult to say whether or not the girls, as an aggregate, actually declined relative to the boys or whether the changes were more artifactual than real.

This phenomenen of IQ test scores changing during one's growth cycle is not only a function of society's expectations for males and females.

IQ test scores purportedly change for a relatively large number of students - changes which are generally attributed to changes in personal adjustment, motivation and/or educational environment. Anastasi (1968) suggests that the constancy in IQ test scores over the growth cycle of an individual is a function of the constancy of their educational environment as well as the time interval between tests. Thus, the longer the time interval between tests, the more likely it is that there will be changes in the IQ test score.

In one of the earliest longitudinal studies, Honzik (1948) found that between the ages of six - eighteen, eighty-five percent of her sample increased or decreased in IQ test scores by ten or more points, fifty-eight percent of which changed fifteen points or more. Thirty-five percent experienced a change of over twenty points and nine percent experienced a change of over thirty points. Large shifts in individual IQ were found in some cases as much as fifty IQ points. These were generally found to be attributable to family SES, educational levels and/or personality factors. She also found that mediocre children of educated parents tended to increase in their IQ scores over time whereas brighter children of uneducated and/or lower SES parents tended to decline in IQ scores. On a somewhat similar note, Sontag, Baker, Kagan and Nelson (1958) found that children whose IQ's increased over time were those who were encouraged by their parents to perform well. These parents expected high achievement and made demands upon their children to excel. Thus, correlations between parent's education, parent's attitudes toward achievement, SES, IQ and its subsequent increase/decrease were established and reaffirmed numerous times over.

According to Boocock (1972) these relationships are a worldwide

phenomenon which have been supported by an extensive cross cultural literature. High IQ, therefore, is generally associated with high SES, high levels of education and culturally advantaged environments in which the values of the home are consonant with those of the school. Provided that these factors remain relatively constant, IQ scores will similarly remain constant. Notwithstanding the relative constancy of one's environment, certain groups are found to decline in IQ scores more than others - lower class children, females, blacks and other ethnic minorities - usually a result of the value conflicts between school and peer group pressures and ultimately, a function of one's SES and/or sex.

The lack of correlation between pre-school IQ scores and later IQ scores has also been noted (Anastasi, 1968; Tyler, 1974) and has been well illustrated in a study done by Jacobs (1970) on a group of nineteen pre-schoolers who had been identified as gifted on the basis of their IQ's. He found that after several years of schooling "only seven managed to maintain their IQ scores at a sufficient level to remain in this category". (P. 122) Interestingly enough, none of these students had been identified as gifted by their teachers. According to him, teachers identified students as "gifted" on the basis of a set of characteristics which were derived from studies on "biased groups leading to biased conclusions" and he questioned whether the students identified for gifted programming were perhaps a different group of students than those demonstrating giftedness in early childhood.

SES, sex, ethnicity, race, the length of time between IQ tests and the age at which tests are written have all been seen as factors influencing the constancy of IQ over one's growth cycle. However, it

is important to note that changes in IQ do not necessarily reflect or determine whether or not actual changes in mental performance have occurred. If girls decline as an aggregate in IQ test scores and boys increase, it is not because boys have become more "intelligent" or that their intellectual growth has suddenly spurted more than the intellectual growth of girls. Rather these changes indicate relative performance to their age peers and in this sense, changes in IQ test scores may often be more an artifact of test construction than representative of actual decrease and/or increase in intellectual growth. Anastasi (1958) indicates that there is evidence to indicate that what is "regarded as intelligence and measured by current intelligence tests changes radically in nature with age". Consequently, one cannot be sure whether the IQ test is even appropriate for certain groups at certain ages.

Variability and change in IQ scores over one's growth period may be attributed to any one or all of the following factors and as a consequence, any decline/incline must be interpreted cautiously:

(1) Intelligence is multifaceted and the various cognitive abilities develop at different rates for different individuals. IQ tests are therefore limited to sampling certain abilities at certain age periods and cannot accurately reflect intellectual growth. (See Piaget, 1969; Bruner, 1966; Guilford, 1959; Pinneau, 1961, et al.)

(2) Test unreliability in measuring intelligence is well acknowledged. Pinneau (1961) indicates that the most extreme fluctuations in test scores over the growth cycles can probably be accounted by an uneven concentration of easy and difficult items at different ages. Barbe (1965) suggests that the tests are not as reliable at the upper IQ limits as they are at the lower and middle ranges and that often, the changes which occur in IQ test scores at

the highest IQ levels may very well be a function of this unreliability.

(3) IQ tests have varying ceilings. Unfortunately, IQ scores are often recorded in student records with no indication of which IQ test has been used. Particularly for students scoring in the highest IQ ranges, any changes in IQ test scores could be a function of different IQ tests being used at different times. All too often there is the assumption that an IQ test score of 150, for example, on a Stanford-Binet will be the same as on any other IQ test when in actual fact, that student's IQ test score will probably be lower since the Stanford-Binet has the highest ceiling.

(4) IQ tests vary in content with some emphasizing verbal skills, others spatial skills and others with a blend of verbal, spatial and numerical skills. In addition, they vary in scale units and standardization samples - differences which basically translate into saying that scores on different IQ tests cannot be assumed to be equivalent to each other. Comparability of IQ test scores derived from different tests therefore becomes problematic. As Anastasi (1968: 64) states:

"If a schoolchild's cumulative record shows IQ's of 118, 115 and 101 at the fourth, fifth and sixth grades, the first question to ask before interpreting these changes is "what tests did he take on these three occasions?". The apparent decline may reflect no more than the differences among the tests. In that case, he would have obtained these scores even if the three tests had been administered within a week of each other".

(5) Changes in the environment, whether in the home, peer group, school climate and/or social context, will similarly affect IQ test score constancy. Usually, the more stable the environment, the more constant the IQ test scores will be over time.

(6) The time intervals between tests will also affect IQ constancy - the longer the interval between tests, the more likely it is that the IQ score will change.

Essentially, the review of the literature on IQ constancy suggests

that brighter students from stable, educationally stimulating environments will tend to retain a relative constancy in IQ scores over the growth cycle although girls will tend to show a slight decline relative to boys during adolescence. Also, both sexes from the lower classes will similarly show a decline in IQ scores relative to higher SES students primarily because of differential educational and/or experiential environments. Another conclusion which can be made from this review is that perhaps the past findings are more artifactual of the measuring instruments than they are of any actual decrease and/or increase in IQ test scores. It seems therefore that a reassessment of former findings is in order.

Differences in Cognitive Styles

To an extent, the general tendency for females to regress toward the mean and for males to remain relatively constant and/or show gain in IQ test scores during adolescence is not unexpected. This tendency may well be a function of both the content of IQ tests and the differential cognitive styles which have been found to characterize male and female modes of thought.

Males tend to be more analytic or allocentric in their mode of problem solving whereas females tend to be more global or autocentric. (Forisha, 1978; Maccoby, 1966) Since IQ tests tend to emphasize cognitive skills and abilities which require analytic modes of problem solving, it is not surprising to find that males tend to show relatively better performance on IQ tests during the time that cognitive styles have generally been well established.

Analytic ability generally refers to the "ability to respond to one

aspect of a stimulus situation without being greatly influenced by the background of a field in which it is presented". (Maccoby, 1966: 35) In other words, it is an ability characteristic of field-independent persons ("differentiated" mode of problem solving) who tend to keep all the parts of the problem separate and who ignore those parts which are irrelevant. They also tend to separate themselves from the problem, i.e. they are "objective" and rational in their approach to the problem and do not personally identify with it.

This mode of problem solving differs from that which has been found to characterize the female mode of problem solving. As indicated earlier, females tend to be more "global" in cognitive style, i.e. field-dependent ("undifferentiated" mode of problem solving). Contrary to field-independent persons, field-dependent persons approach problems more holistically and do not attempt to analyze the component parts. They also tend to personalize and/or identify with the problem and hence, are more "subjective" in their problem solving approach. (Witkin, 1962, 1967; Maccoby, 1966; Coates, 1974; Tyler, 1974; Kogan, 1976; Forisha, 1978) Kogan, (1976) in a review of the research on cognitive styles of preschool children found that contrary to Maccoby and Jacklin's conclusion (1974), sex differences in cognitive styles were pervasive during the pre-school years and that these differences almost all favored girls. He found that girls demonstrated reasonable stability on different cognitive functions approximately six months to one year sooner than boys. In this regard, Coates (1974) found that out of nine studies on pre-schoolers, eight demonstrated higher levels of field-independence for girls with the greatest differential being at age five. It was not until approximately the age of nine

that boys began to score higher on field-independent measures although she found that many of these differentials were not statistically significant. It appears, then, that cognitive differences, as with other sex differences, seem to follow the same timetable of manifestation with the most pronounced differentials between males and females being found during adolescence but seldom at the middle elementary and college age.

It is suggested that these differential cognitive styles are the product of cultural expectations and the differential socialization of males and females. Money (1972: 188) suggests that the boys' analytic/differential mode of problem solving may arise in part from the nature of their play activities. As he explains,

> "Boys, more than girls in our culture, to take another example, intercept a moving ball in their games. Thereby they build up experience not only in visual-motor co-ordination but also in judgments of distance, speed and trajectory, all of which may contribute to the fact that males ultimately outnumber females in superiority of mathematical, spatial and mechanical ability ...".

In addition to play activities, there is another factor which may contribute to the development of particular cognitive styles. This factor is the process by which gender-identity is acquired. In learning to be "masculine", boys have to "abstract" the male role from the cues their mothers give them since their fathers are usually unavailable. As a consequence, their relationships with their fathers are based on an abstract authority and their identification with both their father and the male role is diffuse, i.e. one based upon a collection of abstract elements which they perceive to be the male role. According to Chodorow (1974: 50), they identify "with a fantasied male role

because the reality constraint that contact with (their) father is missing". Thus, they learn to abstract, or to separate out, all those parts of the total environment of bigenderism which are relevant to what they perceive to be the male role, i.e. they analyze, they differentiate amongst the various stimuli and select out the certain elements which they believe to be appropriate for male behaviour.

Girls, on the other hand, learn their female roles with little difficulty or conflict since their proximity to and relation with their mother is direct and immediate. They do not have to abstract relationships and/or identify with an abstract collection of elements which they perceive to be the female role since their interactions are easy and natural, and are not marked by the type of social and physical distance which the boys' interactions with their fathers are. Consequently, their early socialization and processes of gender-identification permit them to develop expressive, affective and intuitive ways of thinking and feeling which are in direct contrast to the more analytic/allocentric style of boys. (See Parsons and Bales, 1955; Chodorow, 1974; Rosaldo,1974 and Tiller, 1967 for a greater elaboration of these concepts.)

However, it is not just the play activities and the nature of gender-identification which yields differential cognitive styles. One must also look to the cultural expectations placed upon male and female behaviours. In Western society, males are expected to be self-reliant, independent, ambitious, unemotional and intellectual whereas females are expected to be the exact opposite - emotional, submissive, dependent and passive. Their early socialization meshes with these cultural expectations. Thus, early differential experiences are provided for

males and females according to these expectations. The resultant cognitive styles emerge from the interaction of these cultural expectations with the differential sex-typed experiences. This explanation seems to be validated by cross-cultural studies on cognitive styles. Berry (1966), for example, in his study on the cognitive styles of the Eskimo and the Temne, found that the Eskimo measured considerably higher in field-independence than did the Temne. Interestingly enough, there were no differences between male and female Eskimos in field-independent measures. He reasoned that Eskimo children had developed field-independent styles because their culture demanded that they be prepared for activities in which self-reliance, ingenuity and skill were involved. He concluded that it was the socialization practises rather than universal biological determinants which were responsible for differential cognitive styles.

Another study by Marjoribanks (1970) on ethnicity and learning patterns found that there were different learning patterns for different ethnic groups. Though there were differences between the social classes, there was the same characteristic learning pattern within the given ethnic groups. He thus concluded that "both social class and ethnicity influence the level of intellectual performance" but that SES did not alter the basic shape of the patterns. (1970: 85) The fact that Jews, as a qroup, scored significantly higher on verbal and number types of skills or, that Canadian Indians scored higher on abstract reasoning than they did on verbal abilities regardless of SES indicated that differential cultural expectations and experiences mediated in the development of particular cognitive styles and/or mental abilities. This finding certainly has implication for the development of sex-typed

cognitive styles which cross class and ethnic boundaries. A fairly recent study by Backman (1972), designed to investigate precisely this relationship between sex, ethnicity, SES and cognitive abilities, found that sex accounted for sixty-nine percent of the variance in mental abilities whereas ethnicity and SES accounted for thirteen percent and two percent respectively. Females obtained significantly higher scores on english language, perceptual speed and memory whereas males obtained higher scores on verbal reasoning, math and general verbal knowledge.

Another related study by Hess and Shipman (1965) found that cognitive styles tend to differ within social classes. They found that analytic/conceptual modes of thought were more characteristic of the higher classes and that the frequency of field-independent styles tends to decline with declining status. Since lower class modes of socialization tend to be more authoritarian and restrictive in terms of the development of inner controls and self-discipline, and since society expects girls to be more compliant and passive than it does boys, it would appear that cognitive modes are very much a function of one's socialization. This is further supported by another study by Witkin and associates (1962) who found that the personalities of mothers had an important effect upon the eventual thinking styles of their children. Mothers of field-dependent children tended to emphasize conformity in behaviour and tended to be more coercive in their modes of discipline. On the other hand, mothers of field-independent children were more democratically oriented and more personally self-reliant and self-assured. Thus, SES, sex, ethnicity and family interaction modes were all seen as affecting the

development of particular cognitive styles.

In addition, the earlier suggestion that the processes of gender-identification also contribute to the development of particular cognitive styles seems to be supported by studies on father-absent boys and of gifted female mathematicians. In a study on the cognitive styles of father-absent boys, Carlsmith (1964) found that father-absent boys tended to score lower on spatial/mathematical aptitudes relative to their verbal aptitudes compared to the father-present boys. She suggested that these findings may be indicative of more global modes of cognition, i.e. the "feminine" style of problem solving. Similarly, Tiller (1967), though not specifically concerned with cognitive styles, found that the boys whose fathers were absent for weeks at a time tended to display more female traits than the boys whose fathers came home nightly. He found that the father-absent boys were inhibitory in displaying aggression, preferred to play with girls and had difficulty relating to other boys. Furthermore, these boys tended to be less mature emotionally and socially and more dependent upon their mothers than the father-present boys. At the same time though, they idealized their fathers more and exaggerated their masculine traits. However, they identified more strongly with their mothers than did the father-present boys. This association and identification with the mother, therefore, raises the question whether their cognitive styles would be more field-dependent than those boys whose identification with the mother was less intense and who themselves were found to be more independent and self-reliant.

This cross-sex identification and its implication for cognitive styles is probably best illustrated by studies on high ability and

or gifted females who have generally been found to resemble boys in many respects - in interests, in academic performance, in personality traits and even in attitude. (Kagan and Moss, 1962; Torrance, 1963; Groth, 1971; Maccoby and Jacklin, 1974) The findings of Klausmeir and Laughlin (1961) seem to suggest that high ability females would probably tend to utilize the analytic cognitive styles generally associated with masculine modes of thought more so than the global and/or intuitive cognitive styles generally associated with females. Their study found that high IQ children showed a greater incidence of noting and correcting mistakes, using a logical and analytic method, verifying solutions and of efficiency in problem solving. Other studies (Terman and Oden, 1947; Guilford, 1959, 1966; Torrance, 1963; Barbe, 1965; Feldhusen, 1966 et al) have found that gifted students tend to demonstrate exceptional abilities in organizing, integrating, synthesizing and evaluating ideas, i.e. those critical thinking skills which are part of the higher intellectual/formal operational cognitive processes and which are generally considered to be characteristic of male modes of cognition. Though these latter findings are generalized to total gifted populations, it is quite probable that the girls in these gifted groups tend to have somewhat similar cognitive styles as the gifted boys. There is sufficient evidence to suggest that gifted girls excelling in math/science tend to have analytic modes of problem solving and quantitative interests/abilities which, in turn, tend to be directly related to an identification with the father, particularly one who is intellectual and analytical himself. (Milton, 1957; Astin, 1974; Fox, 1977; Sherman, 1978). This was demonstrated in a fairly recent study by Helson (1971) who found that female mathematicians tended to identify

more strongly with their fathers than they did with their mothers although she also found that they did not score low on measures of femininity. It would seem then from these studies that encouragement and support are necessary from the mother as well as from the father in order to achieve in male-dominated fields. Girls need to feel secure in both relationships with their parents as well as with their own gender-identity, i.e. they must not feel a conflict between traditional sex-role stereotypes and academic success. Hurley's study (1965) on parental acceptance in which he found that maternal rejection was detrimental to a daughter's IQ appears to be supportive of this.

Thus, in order for girls to achieve they need dual support from their parents so that they can learn to mold their intellectuality with their "femininity". As summarized by Groth (1971: 259),

> "The mother can guide her daughter towards the mysterious beauty of womanhood which develops potential in all areas including intellectual attainment but the daughter must also have her concept of womanhood and intellectuality warmly validated by the father. Otherwise, society will overwhelm her with the manhood achievement concept and she will be poorly integrated and remain truncated in either the cognitive or conative area".

The literature, therefore, seems to suggest that warmth and support from the opposite-sex parent are necessary for achievement and that the father figure is an influential force on the development of particular cognitive styles and subsequent achievements. However, the literature also suggests that there are varying degrees of warmth and support required for both sexes with achievement oriented females being produced by "moderate levels of warmth, a fair amount of permissiveness and a reinforcement for achievement efforts" (Forisha, 1978: 337) and

achievement-oriented boys being produced by higher levels of warmth and control. To quote Forisha (1978: 337),

> "Well-socialized men with warm, controlling parents achieve; well-socialized women with warm, controlling parents become housewives".

These findings on the various socio-cultural factors upon the development of cognitive styles are consistent with those which show that high achievers tend to diverge from traditional stereotypes. (Helson, 1966; Kagan and Moss, 1962; Bardwick, 1971; Maccoby and Jacklin, 1974; Forisha, 1978) As would be expected, the gifted similarly diverge from traditional sex-role stereotypes with gifted girls being more "masculine" and gifted boys being more effeminate than their average peers. Haier and Denham (1976) found that mathematically gifted boys and girls were more like each other on non-intellectual measures than they were like their average peers. Similarly, Hitchfield (1973) found that both gifted males and females were able to rise above the cultural stereotypes and the restrictions placed upon sex-typed behaviours. Findings by Littlejohn (1967) showed that boys of 130+ IQ demonstrated more feminine traits than the under 130 IQ boys. These findings were reversed for girls, i.e. the over 130 IQ group showed fewer feminine traits and more masculine traits than their lower IQ counterparts. A related finding was that these same girls scored equally well as the boys on the Math/Science tests and, though their interests were not as high as the boys, they were nonetheless more interested in Math/Science than were their average sex-typed peers.

In terms of creativity, Torrance (1961: 218) found that the most creative individuals deviated from traditional male and female stereotypes such that "we may expect the highly creative male to appear more

effeminate than his peers and the highly creative girl to appear more masculine". It would seem that if this is indeed the case, then society, by insisting upon conformity to sex-role stereotypes, is actually inhibiting the development of ability and/or talent. Because children are forced very early in their development to conform to masculine and feminine patterns, in actual fact, they sacrifice their creativity. Girls in particular become a major talent loss since they are conditioned to accept things as they are and not to manipulate or change them. This conditioning is reflected not only in the smaller numbers of female inventors, scientists and eminent persons but also in the smaller participation ratios of females in fields of study which correlate with innovation and risk-taking.

It is quite paradoxical, then, that the most "masculine" boys and the most "feminine" girls are also the least "intelligent" and creative. It would seem that society, by rigidly enforcing sex-role stereotypes, values dysfunctional and mythical images more than it does intelligence - and if intelligence and cognitive functioning are influenced by hormonal activity as has been suggested by various researchers, then, by logical extension of this assumption, the most intelligent males and females are atypical and slightly deviant members of their own sex group. Obviously, this cannot be true. Therefore, it raises the question of the validity of the sex-role stereotypes in defining individuals as well as the validity of the assumptions surrounding horomonal determinants of intellectual functioning.

These findings, however, raise many questions. To what extent are personality traits related to cognitive styles? If girls excelling in math/science are found to have analytic modes of cognition and

somewhat more "masculine" traits, then why is it that the most gifted males in math/science presumably with analytic cognitive styles have more "feminine" personality traits? To what extent is identification with the father or mother related to cognitive styles and is this relationship similar for both sexes?

It is obvious that more research on cognitive styles is necessary of both gifted and general populations in order to begin to unravel some of the puzzles in the differences in intellectual functioning.

Verbal/Spatial Abilities

It is a conclusive finding that females tend to excel in verbal abilities and that males tend to excel in visual/spatial abilities. These differential aptitudes are reflected in achievement on IQ tests having verbal/non-verbal components, on standardized achievement tests and on school subject tests. (Maccoby and Jacklin, 1974; Tyler, 1974; Kolesnik, 1969; Williams, 1977; Backman, 1972; Forisha, 1978; Anastasi, 1958) Thus girls, though generally better achievers in school than boys, tend to perform better in the school subjects which are oriented towards the verbal/communicative skills, i.e. reading, spelling, grammar and language whereas boys tend to perform better in the school subjects which are oriented towards the visual/spatial skills, i.e. math, science, geography and history.

These differences tend to be most pronounced during adolescence, i.e. the years between ten and sixteen, although female verbal superiority between the ages of two to approximately seven has also been noted. However, Maccoby and Jacklin (1974) warn against generalizing this superiority in the early years to differential maturation for

two reasons:

(1) the rate of intellectual development does not necessarily parallel the rate of physical development and

(2) the early superiority of girls tends to be in populations of disadvantaged children in which boys constitute a high risk population.

Studies on elementary gifted students suggest that this caution of generalizing verbal superiority to females during the primary grades is warranted since gifted boys have been found to achieve better in reading and verbal skills than average girls. Their achievement has been found to be similar to that of gifted girls although gifted girls do tend to speak and read earlier than gifted boys. (Kincaid, 1963/1964; Barbe, 1966) Consequently, the generalization that girls tend to perform better in verbal skills cannot be considered applicable to all populations. The target population, the SES background, the experiential background and the ability level of the subjects must be taken into consideration when making conclusions since performance of any task depends upon previous experience and/or length of training.

In school performance, particularly in reading, Thompson (1975), Dwyer (1973) and Johnson (1973) found that girls, as a group tend to perform better throughout the elementary grades although by approximately the age of ten, these differences are no longer apparent. Related to this finding is one which shows that males outnumber girls in resource rooms and in numbers having learning disabilities and reading problems. Though Clark (1970) found no sex differences in reading attainment between elementary boys and girls, she did find a larger number of boys in the slower reading groups. Morris (1966) similarly found no sex differences in either proportion or attainment in the "good reader" groups

although she too found more boys in the "poor reader" groups.

Explanations for the relatively poorer performance of males in reading and/or verbal skills and the consequent larger number of males in remedial rooms tend to focus upon several factors:

(1) The elementary school is seen as a "feminine" institution in which both the expected behaviours and the type of activities in which students generally participate are more stereotypically "female". Reading, writing, drawing, sitting quietly, not talking out loud and being compliant are all seen as "feminine" behaviours and consequently, are seen as presenting conflict situations for boys since they are expected to behave in ways not "natural" to them. (Kolesnik, 1969; Austin, Clark and Fitchett, 1971; Frazier and Sadker, 1973)

(2) Pre-school experiences for boys tend to be different than those of girls who have essentially learned the "student role" through their interactions with their mothers and their peers.

(3) There is greater pressure and concern from parents and society in general for males to achieve. Because ultimately they will have to pursue a career and support a family, they are expected to do well yet at the same time, they find that the school and curricular content are "female-oriented". The competing pressures and demands often result in under-achievement and/or in compensatory measures for proving their "masculinity" by being discipline problems, poor workers, more interested in sports and/or peer group activities.

(4) It is believed that males mature slower than girls both physically and cognitively. Apparently, by the time girls are five or six years old, left brain dominance has already been established whereas for boys, left brain dominance does not occur until a year or so later. It has been suggested that this earlier lateralization of the brain in girls provides the explanation for their greater verbal vacility during the first few years of childhood since it is assumed that the left brain controls the verbal and/or

language functions. (Knox and Kimura, 1970; Williams, 1977; Maccoby and Jacklin, 1974)

(5) Girls are able to identify with the female role more readily than boys can with the male role and therefore, girls are more responsive to school demands, especially since their first teachers are likely to be female. Boys are quite likely to feel insecure and consequently are more anxious about learning than the girls are.

These same findings seem to be true of "gifted" populations as well. Though there is not an extensive literature on sex differences between gifted males and females for reasons discussed previously, those studies which have investigated the differential task performances tend to agree with these general conclusions at least on the mathematical/spatial superiority of gifted males. The studies by SMPY (Studies on Mathematically Precocious Youth) consistently show superior performance in math by males from grade seven onward. (Fox, 1977; Stanley, 1976, George and Solano, 1976; Keating, 1976) Fox found large discrepancies between gifted males and females in mathematical/reasoning ability. As she has stated "In 3 years of testing mathematically gifted students, SMPY found 167 boys but only 19 girls who as 7th and 8th graders scored 640 or above in the scholastic aptitude test". (1977: 115)

Several other studies have focussed upon the behavioural variables of gifted males and females in science classes with implication for their respective achievements. Gallagher (1967, 1975) found that in junior high biology classes for gifted students, the girls tended to be less expressive, less opinionated and less likely to challenge their teacher or peers. Their achievement was related to the degree with which they participated in the classes. The more expressive students tended to be

more knowledgeable, to have superior scientific aptitudes and to have better test scores. As would be expected the boys tended to be the most expressive and also the best achievers.

In terms of verbal abilities of the gifted, there are conflicting research findings. Some have found sex-typed effects (Backman, 1972; Hitchfield, 1973; Sheverbush, 1974); others have not. McGinn (1976) for example, found no sex differences between gifted male and females in verbal abilities. In a contest conducted by SVGY (The Study of Verbally Gifted Youth) more females than males had entered the contest but no sex differences in terms of test scores were found. Other students who had entered SMPY (The Study of Mathematically Precocious Youth), a program sponsored by John Hopkins University, were similarly given the verbal battery of the scholastic aptitude test and similar findings were obtained. There were no sex differences in verbal test scores. As Fox (1977: 116) observed, "it is interesting that sex differences in cognitive abilities found in general adolescent populations are found in gifted samples in the quantitative area but not the verbal".

This finding of equal performance on verbal aptitude tests by both gifted males and females of adolescent age is partially explainable by considering the definition of the gifted and also their SES origins. Gifted students, as indicated in a previous section, tend to be primarily of higher SES origin and tend to have parents who have high levels of education. Therefore their verbal superiority may well be a manifestation of their early socialization experiences into a formal linguistic code (Bernstein, 1961). Also, they tend to be identified as "gifted" on the basis of their verbal skills. Consequently, their

superior verbal performance may be an artifact of the definition of "gifted" since both gifted boys and girls tend to "have unusually advanced vocabulary for age and grade level; use terms in meaningful ways; have verbal behaviour characterized by 'richness' of expression, elaboration and fluency". (Renzulli and Hartman, 1977: 62)

This seems to be supported by a number of studies which have sought to examine the relationship between "giftedness" and SES. Frierson (1965) and Getzels and Jackson (1962) found that gifted students from higher SES tend to have higher verbal task performance than gifted students from lower SES backgrounds. Bonsall and Stefflre (1955) found that when SES was controlled, the differences in achievement between the able and the average disappeared. Consequently, when findings regarding the respective achievements of gifted males and females are considered in light of the findings in general populations, it appears that to an extent, the verbal superiority of gifted students, male and female, may be a function of their SES origins. As the review of the achievements of the gifted has shown, the generalization that girls tend to excel in verbal/reading skills obviously cannot be extended to all student populations. The tenuousness of the argument that sex differences in intellectual functioning are innate becomes considerably more fragile when other factors are controlled besides ability and SES. Cross cultural studies tend to show that patterns of ability and achievement between males and females differ from culture to culture and do not necessarily replicate the patterns which have been found for males and females in North American society. Preston (1962), in a comparative study of the reading achievements of German and American grade four - six children, found that the mean

achievement scores for American girls was higher than for American boys but that the reverse was true of German children. Johnson (1973) similarly found that the achievement of girls was higher in Canada and the United States but that the achievement of boys was higher in England and Nigeria. Hopkinson (1978: 96) found that in Great Britain the same general pattern of differential achievement in the early grades tended to resemble that of North American boys and girls but that from age eleven onward, British boys performed better in both reading and math/science. His explanation centred upon the fact that Britain was "not yet emancipated from a 19th century social philosophy which set educational institutions the task of training girls in useful skills and gracious leisure - time pursuits". Implicit then was the fact that Britain was a more "closed" and traditional society and therefore, more stereotypic in its expectations for sex-role adherence. Consequently, female aspirations were for short term training and early marriage since educational attainment for them was not encouraged or valued. The resultant differential achievement of males and females during the years that career decisions were normally made attests to the strength of the stringent cultural expectations upon the ultimate educational/ occupational attainments of males and females respectively.

There is one other set of studies which should be considered in this section of differential achievements between males and females and which relates to general achievement patterns of gifted populations.

In general, the achievement of gifted students in both regular school performance and standardized tests tends to be consistently higher than the achievement of their more average peers (Terman, 1925; Barbe, 1965; Horral, 1957; Gallagher, 1963; Drews, 1963) although their

achievement on standardized tests tends to be more notable than it is on teacher graded tests. This finding, however, is not at all surprising and is wholly consistent with other findings demonstrating that (1) teachers, male and female, tend to grade girls higher than they do boys (Northby, 1958; Boocock, 1972; Kolesnik, 1969); (2) that boys tend to achieve better on standardized tests than they do on teacher-graded tests (Anastasi, 1958; Kolesnik, 1969); and that (3) the gifted tend to be mostly male (see earlier section in Chapter III). Consequently, it is anticipated that gifted males will perform better on standardized tests than they will on teacher-graded tests and that their standardized test scores will tend to be better than, or equal to, those of gifted girls. However, since no studies have been found which have examined the comparative achievements of gifted males and females in standardized and teacher graded tests, this assumption awaits empirical validation.

It would seem that the superior achievement of gifted students in both regular classroom and standardized test performance can partly be attributed to the selection procedures and the definition of the gifted just as their verbal superiority could be. As defined, the gifted are those who are excellent achievers, have high standardized test results and tend to perform two years in advance of their chronological age peers. By definition, then, they have been identified as "gifted" because of their generally superior achievement in school subjects. Consequently, these findings tend to be artifactual of the definition of gifted populations.

Furthermore, it will be recalled that the gifted are generally identified on the basis of high IQ test scores. Since IQ tests are

purposely designed to measure how bright a student is on items which are school related, they measure the student's aptitude to succeed in school. Therefore, the correlation between academic achievement and IQ is high. Tyler (1974: 44) indicates that the correlation between school performance and IQ tests is in the order of .4 - .6. Given the fact that gifted students are generally those scoring over 130 on IQ tests, it would be expected that they will be superior achievers. Even though they may be underachieving in terms of their own abilities, compared to their average peers their achievements will still tend to be of superior quality.

Summary

The review of differential achievements between males and females in general populations as well as in gifted populations has shown that the differences in achievement tend to be curiously similar to the traditional sex-role stereotypes which define what is appropriate for the respective sexes. Moreover, the particular times during which these so-called sex differences emerge are the same times during which the social pressures to be "masculine" and "feminine" are the greatest, i.e. during the first few years when boys and girls learn their gender-identities and during adolescence when bodily changes reassert this identity. Since the cognitive skills supposedly distinguishing male and female intellectual functions do not appear until the fifth or sixth grade after sex-typed interests and identities have already been established, and since different patterns of intellectual functioning seem to exist cross-culturally, it would seem that the sex differences which have been found to exist in academic achievement and intellectual

functions are the "Pygmalian effect" of our definitional structure surrounding "feminity" and "masculinity". That sex differences are a consequence of sex-role stereotyping seems to be implicated by this review of findings on both gifted and general populations.

II

An Overview of Sex Difference Research

Having considered the literature on male/female differences in the previous section, it appears that there are only a few differences which are generalizable to the aggregates although there are other clearly observable differences between the sexes, most notably "social" differences, i.e. differences in their interests, values, achievements and social interaction patterns. However, these differences tend to show a wide variation between the sexes and considerable overlap in their distribution and therefore, cannot be assumed to be behaviours which are distinctive to only one sex. Because researchers have found that most sex differences heretofore assumed are ungeneralizable to <u>all</u> males and <u>all</u> females in <u>all</u> age groups, the discussion of sex differences between aggregates becomes problematic. Perhaps one should be more concerned with "which men" and "which women" or "which man" and "which woman" when discussing sex differences instead of assuming that sex differences which have been found, for example, between a group of males and females in a rural area or between a group of males and females in a private school for gifted youngsters are equally applicable to other males and females.

Thus it is that research on sex differences has been highly

criticized and the findings have been found somewhat questionable. Williams (1977), Maccoby and Jacklin (1974), Mednick (1976), Weisstein (1977), Bardwick (1971, 1972) Forisha (1978), Millett (1969) among others, have been some of the major critics. They have argued that past research has been wholly inadequate and that it has been characterized by faulty problem definition, inappropriate measurement techniques, incorrect interpretations and most importantly, by male biases. Moreover, they have argued that too many conclusions have been reached on erroneous assumptions and that often, generalizations have been made on the basis of all male or all female samples which were then extended to suggest differences between the sexes.

Perhaps what has been seen as the most problematic has been the nature of research. The majority of studies have contented themselves with demonstrating the obvious and to this extent, one must agree with Parlee (1978: 69) who has said that "a sex difference in color perception is of no scientific interest until one can understand how it came about and what consequences it has for social behaviour". In other words, the demonstration of sex differences in what are often seen as inconsequential behaviours and which have been obtained in sterile experimental settings on subjects who may or may not have been controlled for SES, age, IQ, race, educational level or motivation, can hardly purport to add to scientific knowledge or explain why behaviours and/or differences have emerged. The fact that more first-year college males can solve a larger number of anagrams within a given time period than females hardly advances one's knowledge of sex differences nor does it suggest an explanation for these differences. It could very well be that the students who volunteered to participate

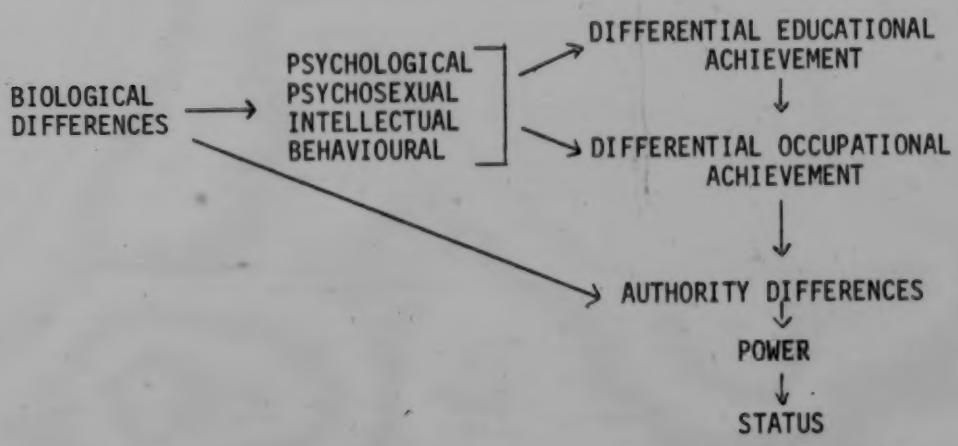
in the study had different experiences with anagrams, different training or perhaps were even of different abilities.

Too many studies, therefore, have been purely descriptive, ahistorical and atheoretical and often methodologically unsound with the consequence that conclusions have been too hastily extended to the sexes as universal truths. Though significant changes have been made, the majority of studies remain too speculative and inferentially based to state unequivocably that certain differences are generalizable to the sexes.

In many respects the study of sex differences and their etiology parallels the study of the gifted. In fact, today's debate appears to be a replay of the debate which had focussed upon the IQ and intelligence testing during the 1920's and was later renewed in the latter part of the 1960's with Jensen's work. Not only do the issues resemble each other but also the reactions of various researchers, academicians and critics. Many refuse to accept the existence of sex differences, save for the most obvious; others claim that even if there are differences, biological determinants are not the causative factors; still others are skeptical and argue that the results of the research are too inconclusive to make a statement one way or the other; and of course, there are others who see biological determinants as the prime causative factors for the differences between the sexes.

The varied reactions ranging from denial to skepticism to total acceptance of differences stem from essentially the same reason that the varied reactions did during the 1920's, i.e. an opposition to the belief that differences are "inherited" and genetically predetermined. Just as there were scientists then attributing differences in

"intelligence" to biology, there are scientists now attributing sex differences to biology. Consequently, much of the criticism and repudiation of past research is a backlash to this "back to biology" trend in scientific explanation. The current biological determinism, somewhat more modified and more sophisticated than the type of determinism which characterized scientific thought in the 1920's, appears to be reinforced by the fact that there are fewer female professionals, artists, inventors and known "geniuses" in a supposedly open society in which individual mobility is based upon merit and "intelligence" and in which equal opportunities exist regardless of race, creed or sex. Because women do not occupy these higher ranking positions, it is assumed that it must be because they are not as capable as men. Very simply, this type of determinism can be schematized as follows:



In short, it is assumed that the differences which arise between the sexes are ultimately attributable to biological differences, a generalization which appears to gain more credibility when the findings of the recent brain studies, Maccoby and Jacklin's conclusions

regarding cognitive differences between males and females and the respective achievement differentials are considered. Taken together, these differences appear to be overwhelmingly supportive of the biological argument although, as has been seen, these corresponding relationships are equally convincing for the socio-cultural explanations which have been put forth for differential achievements.

It will be recalled that Maccoby and Jacklin (1974) came to the conclusion, based upon their analysis of over 2,000 studies on sex differences, that there were only four sex differences which were generalizable to male/female populations and which might have implication for differential behaviours and cognitive functioning. Three of these were cognitive and one, psychological, i.e.

(1) that males tend to excel in visual/spatial abilities

(2) that males tend to excel in mathematical abilities

(3) that females tend to excel in verbal abilities

(4) that males tend to be more aggressive.

From the previous review of the differences between males and females it was seen that these differential aptitudes appear to be highly related to the differential achievements in the school setting which in turn, appear to be related to the occupational/professional attainments of the respective sexes. Consequently, males tend to dominate in those professions/occupations in which the spatial/mathematical skills are required, i.e. engineering, architecture, business, medicine, the various sciences and technologies whereas females tend to be located in those job related activities in which

verbal skills, fine motor co-ordination and "sociability" are required, i.e. nursing, teaching, secretarial and other social services.

These relationships between differential aptitudes, achievement and occupational/educational attainments seem to be further supported by the findings of the recent brain studies which have tended to dominate research into sex differences within the past five or six years. Undoubtedly, this particular emphasis on the brain as the source of sex differences has been considerably intensified with the vocal protestations of the feminists that there are no differences between the sexes and also with the publication of Maccoby and Jacklin's conclusions. Thus, not surprisingly, brain researchers are suggesting that men and women tend to think differently, tend to excel in different intellectual functions; tend to have differential brain organization and tend to have their intellectual functions affected by hormonal activity - all of which have given rise to the notion that the brain is a "sex organ". According to this hypothesis, hormonal activity is different in both sexes and therefore, results in different sensitivities to sensory stimuli, different capabilities in handling their environment and consequently, of differential abilities. Those adhering to this school of thought would undoubtedly explain differential achievement as Wittelson (1978) has done:

> "The fact that women are under-represented in certain professions could be due to brain functions as well as sex bias in hiring. There may be fewer architects, engineers, artists ... because such professions require the kind of thinking that may depend on spatial skills ... women performers (vocalists, instrumentalists and writers) are less rare. This may be because the skills involved in these talents may depend upon functions women do well - linguistic and fine motor co-ordination".

However, these findings readily admit to being based on inference from the respective performance of males and females on varied tests (Goleman, 1978), many of which have been obtained from tests and/or observations of clinical deviants. To what extent these conclusions would be valid to normal populations, within all age groups, SES and educational levels remains problematic. There are too many unknowns about the way in which individuals process information, in the way in which hormonal activity affects intellectual development (if, in fact, it does) and even what constitutes intellectual functioning. As Kinsbourne (1978: 51) has argued,

> "There is the assumption of a one to one correspondence between hemispheric specialization on the one hand, and performance of electric asymmetry on the other. But there is as yet no acceptable evidence for this claim. For instance, how hard a person tries, how good he is at the task and the way he goes about it all could affect the right-left ratio. Only if you could hold all these factors constant can you compare the hemispheric specialization of individuals or of samples of males and females. No one has done that yet".

These brain studies are strangely reminescent of the type of studies which were carried out at the turn of the century and which, in turn, were used to support the theory that women were innately inferior. It was assumed then that because women's brains were smaller than those of men and that their frontal lobes, relative to their parietal lobes, were similarly smaller, they were obviously inferior. (Parlee, 1978) In addition, it was assumed that their exclusion from public life for so long had rendered them incapable of intellectual pursuits and so-called "male" activities that, as an adaptive measure, their brains atrophied relative to those of men, and subsequently,

they naturally came to occupy their more subordinate social and occupational roles. In essence, it was believed, to quote an oft-used phrase, that "biology was destiny". Insofar as women were concerned, this meant that it was natural, functional and inevitable that women assume the childrearing, domestic and nurturing roles. Their subsequent differential achievements were thereby explained as natural consequences of their "God-given" abilities.

Considering the past history of brain studies and the use to which they had been put, it is not at all surprising that the recent concentration of studies on the brain and the suggestion that the brain is the source of manifest differential achievements between males and females has been met with considerable skepticism. As many feminists see it, it is a retrograde step. Since science has never been known to be value-free, they fear that these findings will once again be used as a mechanism to keep women in their place. As Bernard (1975: 19) argues, "a review of the research literature on women found that it did indeed harbour an ideological bias which, implicitly or explicitly, accepted the status quo and took for granted that women adjust to it regardless of whether its role was congenial to them". Unfortunately, women's biology has served as the cultural rationale for their treatment as inferiors and their subsequent exclusion from positions of power, influence and material reward. Accordingly, their manifest differential abilities and achievements have been seen as a function of their innate, biological inheritance, thus, scientific explanation once again becomes deterministic.

Given the role which science has unwittingly played in reinforcing the mythology of female inferiority, it has consequently become the

focus of considerable criticism. Psychology and sociology, in particular, have been singled out as the perpetrators of a social mythology through their tacit acceptance of prevailing ideologies regarding sex differences.

Millett's criticism (1969) is typical of the backlash which has developed in response to the research on sex differences. In her book, Sexual Politics, she criticizes the studies of Brim (1962) and Barry, Bacon and Child (1957) which she sees as reactionary status quo sociology. Despite the fact that both studies conclude that masculine and feminine behaviour "is the result of long and careful years of socialization, the conditioned product of reinforcement by punishment and reward", Millett argues that they maintain that the culture only "imitates and carries out the inevitable demands of nature". (1969:223) She further argues that the Social Sciences are prone to fall back on a "biological mystique" by maintaining that "the order of things which it describes (often mistakenly) is in fact the very order of necessity". In her criticism, therefore, there is a complete dismissal and rejection of former scientific explanation because of its ultimate reversion to biologism in explaining the differentials between the sexes.

Mednick (1976: 764) similarly sees the social sciences as perpetuating the "biological mystique". She argues that Psychology, by maintaining an image of women and passive, inferior and powerless victims, is an actual fact a "subtle and not so subtle weapon for keeping women in their place".

From the nature of the criticisms, it would seem that scientific inquiry has largely been built upon myth insofar as sex differences

are concerned. No longer is science considered sacred. It is seen as wholly inadequate and incapable of accurately explaining sexual realities and consequently, it is not difficult to understand the skepticism which surrounds the various findings of sex differences in intellectual functions. The numerous interpretations, methodologies and assumptions upon which all previous research had been based are in total reflective of the males biases which have tended to dominate scientific inquiry, or, as Bernard (1975: 23) argues, "the values of a male world in which the cult of macho prevails".

The current debate, therefore, cannot be regarded as apolitical. In the same way that the debate surrounding the nature and nurture of "intelligence" and "giftedness" had social and political implications, so does the research on sex differences. Scientists today may approach their studies seemingly objectively and rationally but there is always the danger that their interpretations will be used to justify the current subordination of women and that the latter will continue to be treated as unequal. Today's challenge to the biological argument is primarily one of demystification in which the definitions regarding "masculinity" and "femininity" and the immutability of sex roles are seen as problematic.

From the challenges of the past in which "intelligence" and "giftedness" were questioned arose new theories of "intelligence" and new conceptions of "giftedness" as well as new social and educational policies; it remains to be seen whether similar reconceptualizations will occur regarding male and female roles and their respective abilities or whether the following will continue to ring true -

" ... some must become officers in the army,

> while others must attend to the sick. Some must swing the hammer while others must type. In our society, the choice as a rule, has largely been based on one clear criterion, i.e. the sex of an individual. This choice, of course, was by no accident ..."
> (Brun-Gulbrandsen, 1967: 77)

III

The Etiology of Sex Differences

Biological propensities in themselves offer only a partial explanation for the etiology of sex differences since organisms coexist with other organisms and their behaviours are in large measure a response to the behaviours of others. That is to say, their development occurs through an interactive process and they grow and mature only through their experiences with their environment. Consequently, biological propensities do not, nor cannot, totally explain human behaviour. In assuming that biology alone causes differential behaviour patterns between the sexes is to negate the possibility of social influences as well as individual organismic responses. Experiential factors must intervene between the two. Organismic and social factors are inextricably bound together and the resultant behaviours are the product of the interaction of these factors.

Numerous studies on animals and of children reared in isolation illustrate the extreme importance of the environment in the development of the biological organism. All organisms require a stimulating environment in which to grow and to thrive. In the case of humans, without the "social" environment which necessarily includes interactions with other people, they are not "human" in the Cooleyian sense. To be human is to be able to symbolize and to empathize - and to symbolize

is to give meaning to, and extract meaning from, the acts of others. This cannot be done in an ideological vacuum - every act, every word is emotively and evaluatively laden. Consequently, the biological propensities which human organisms may have towards certain behaviours are mediated and shaped by their social environments. According to Mead, all behaviour is social behaviour - as he claims, "these physiological bases of social behaviour - which have their ultimate seat or locus in the lower part of the individual's central system - are the bases of such behaviour, precisely because they in themselves are social ...". (1934: 203) Since behaviour always involves the co-operation of one or more individuals, the physiological/biological base alone cannot explain the developmental processes of human behaviour and/or sex differences.

The case of Anna illustrates this point well.

> "Anna was an illegitimate child, confined to one room from infancy. She had very little contact with other human beings. The mother brought her milk but otherwise paid little attention to her, not ordinarily taking the trouble to bathe, train, supervise or cuddle her. When Anna was found at the age of 6, she showed few, if any signs of human nature. She was described as completely apathetic; she lay on her back, immobile, expressionless, and indifferent. She was believed to be deaf and possibly blind. She lived for another five years, first in a country home and later in a foster home and school for retarded children, and in this period developed only to the level of the normal two-year-old". (Elkin and Handel, 1972; 21)

Other studies of children reared in institutions with little human care during infancy as well as studies of baby chimpanzees and puppies (cited in McV. Hunt, 1968) indicate that even the physiological and/or cerebral structures are affected by the interaction with the

environment. McV. Hunt, after a review of the different studies on the effects of early experiences on the developmental processes, feels that the findings lend credence to the hypothesis that "the importance of the effects of early experience increases as the associative or intrinsic portions of the cerebrum increase in proportion". (1968: 335) For humans, who have a proportionately large cerebral mass, environmental experiences are crucial for their development as social and intellectual beings.

Because all human organisms need and require the supportive and facilitative influences of experiential factors to develop and therefore, to contribute to the enactment of their behaviour, behaviour cannot be developmentally "fixed", i.e. it cannot follow a genetic pattern or blueprint since the organisms develop only through interaction with their environment. This necessarily suggests active organisms - ones which act and are acted upon by their environment and ones whose resultant interactions affect and shape the ordering of their reality. Through their experiences, organismic changes occur, which in turn, affect their future experiences. This process of development suggests that behaviour occurs in a dialectical and processual manner, i.e. that behaviour arises through a dynamic, complex process whose expression is limited only by the developmental/maturational stages of growth of organisms. Because females and males begin with different physiological structures, their interactions with the environment generate differential experiences which in turn, give rise to different realities.

Differences between the sexes have never been studied, nor ever could be studied, in contexts free of cultural effects, and the extent

to which sex differences are natural and inevitable can never be known. Cultural conditioning is one of the few constants in human life and consequently there is no way of knowing the extent of natural human variability. From the moment of birth, boys and girls are assigned gender roles and gender identities which serve to circumscribe the nature of their activities and the development of their personalities. As critics have been careful to point out, sex is biological, gender is cultural. Therefore, it is not the biological differences but the cultural values and interpretations which have been placed upon these biological differences which are significant in the study of sex differences and which must be examined in order to arrive at a more plausible explanation. Thus, when one speaks of sex differences between aggregates, one must look to other factors which determine the social environments and which ultimately regulate and guide the enactment of male and female behaviours. Consequently, differences between the sexes which are presumed to be biologically based can never alone determine differential achievements. They are complemented by socialization processes which, in turn, are influenced by ideological structures within society.

This interactionist perspective is clearly implicated in the development of sex-typed behaviours. According to Maccoby and Jacklin, (1974) there is considerable latitude in child-rearing practices and sex-typed behaviours are not strictly enforced nor necessarily taught by the parents during infancy or early childhood although there is more pressure upon the boys than the girls to behave in gender-appropriate ways. Furthermore, learning gender appropriate

behaviours through reinforcement or through imitation does not seem to occur consistently. In other words, children do not always model their like-sex parents nor imitate like-sex models. Instead, they learn a large repetoire of behaviours from both same-sex and opposite-sex models as well as learning the gender-appropriate behaviours through observation and/or experience by seeing the kind of consequence which is received for the enactment of a particular behaviour.

Consequently, boys and girls acquire behaviours which are not necessarily sex-typed through their learning experiences. In the final analysis, it appears that the organism itself plays an active role in making sense of its world and in shaping its own behaviours according to the beliefs and expectations of others.

This necessarily suggests that the development of sex-typed behaviours occurs through a process of symbolic interactionism - that the image that one acquires of oneself as a member of a particular sex is not static and that at certain times, identification as a member of a particular sex is important but that at others, it is irrelevant to one's behaviour and performance of the task at hand. It would seem that with the assignment of a gender to the baby at birth, it sets in motion a set of patterned responses and meanings which thereby govern one's responses to the child. Its social experiences are necessarily and automatically gender-dichotomized and even though parents may not differentiate in terms of their treatment of their opposite-sex children, there are qualitative differences in the pattern of interactions between themselves and their children. They dress their children differently, they "label" them by sex, and the language which they use indicates a fundamental difference between

"male" and "female".

Moss (1967) found that differences in behaviour between boys and girls are noticeable as early as three weeks following birth. According to him, parents respond differently to their opposite-sex children and,

> "as the infant gets older, the mother, if she behaved contingently toward his signals, gradually acquires reinforcement value which in turn increases her efficacy in regulating infant behaviours ... the mother's reinforcement value could be regarded as the first manifestation of socialization".
> (1967: 29)

Because the family is not the sole socializing agency for shaping sex-typed behaviours, children learn from other sources - from aunts, uncles, neighbours, the media, peers and other social agencies - that females are supposed to behave differently than males. These secondary agencies present sufficient counter-demands that the children become more sex-typed in behaviour through a process of self-identification. This suggests that it is the process of naming and labelling, with its implicit set of meanings and actions, which is internalized by the children through their interaction with others whose meanings serve as the guide for encouraging and calling out certain sex-typed behaviours. Children "copy the meanings of an act" rather than the act itself. This explains why they do not necessarily model like-sex parents all the time and why they do things which are generally assumed to be peculiar to the opposite sex. Furthermore, Maccoby and Jacklin (1974), Kohlberg (1966) and Lipman - Blumen (1976) suggest that the prestige of a model often over-rides the appropriateness of a behaviour for the sexes. As a consequence, one may find that a young child is influenced

by a powerful figure and will imitate this figure regardless of his/her sex. Thus it is that one can find little boys often imitating their mothers or little girls imitating their fathers until such time that they discover that these behaviours are not appropriate.

They also suggest that the male figure, physically larger and stronger, commands more power and prestige than does the more diminutive figure of the female. Through a variety of processes - shaping by significant others, modelling and self-socialization - children interpret the power relationships between the sexes and learn the appropriate sex-typed behaviours. Their achievements and attainments in the educational/occupational setting are a reflection of these processes.

The theories of Mead, (1934) Parsons and Bales, (1955) and Kohlberg (1966) are particularly useful in considering the etiology of sex-typed behaviours since in the development of the organism and the concomitant process of individuation, the child learns not only to "objectify" himself but also to identify himself as a member of a given sex. Consequently, with the development of cognition comes the development of the "self", albeit not immediately since the "self" develops gradually through the process of interaction with others. Since one's sex is an important aspect of one's identity, and hence of one's "self", it would seem that in the process of distinguishing oneself as apart from the body that there is also a recognition and awareness of the body. This awareness of oneself carries particular import for the sexes since one's physical appearance, particularly in later life, definitely "labels" one as either "male" or "female". It is one of the main distinguishing features which directs the behaviours and actions of others and therefore, in the process of individuation

and of internalization of the meanings of others, there is also the internalization of one's sex identity.

Implicit in the process of individuation is the process of role acquisition. In this process, the child learns the appropriate behaviours of his/her gender through the interactions with others since they have normative beliefs about what his/her behaviour should be. An important aspect in this process of socialization is the fact that the interaction with cross-sex parents permits the child the opportunity to learn his/her role through a process of complementation, i.e. the cross-sex parent interacts and/or responds to the child the way he/she would with his/her spouse. Thus, a father will encourage his daughter to be soft and cuddly and will want her to dress femininely so that she will be "cute" and attractive whereas on the other hand, the mother will respond to her son the way she would to her husband or any other male. In their analysis, Maccoby and Jacklin (1974) indicate that though the research on cross-parent interaction is minimal, cross-sex shaping is considerably more influential and positive in the development of sex-identity than is same-sex parent shaping. The obviously different patterns of interaction between father and daughter, mother and daughter, father and son and mother and son, have to have a significant effect on the development of personality and sex-typed behaviours.

In connection with this issue of gender identity is the fact that as children grow up they are raised in an environment of "bigenderism" i.e. an environment in which they receive two sets of stimuli at one time and in which each contains a set of expectations for appropriate behaviours and responses. The child is expected to identify with one

of these sets of stimuli and to reciprocate the other in a complementary manner. In terms of gender identity, the process of "naming" things requires that they be categorized and the child, in so doing, defines the classes of objects by virtue of their relationship to other classes. This particular process assumes special significance in the process of gender-indentification, for the child, in naming himself as a member of a particular sex, in actual fact puts himself and that category in direct relationship to the other category. Consequently, a child in his/her earlier developmental stages, sees males and females as constituting two different and opposite categories and in effect, is responsible for stereotyping and/or polarizing sex behaviours. By defining himself in a particular way, or by naming a particular object, he/she also adopts a "cognitive map" which contains meanings and evaluations for the individual actor. It is this "map" which guides actions and appropriate behaviours. In short, naming oneself "male" or "female" contains directives for action which are acquired through the process of "taking the role of the other". Consequently, a child by identifying himself as a "male" also learns that a male is opposite to a "female" and that his behaviours are similarly different from those of the female. In this way, by learning one's gender identity through complementation and identification, one learns sex-typed attitudes and/or behaviours. To put it another way, "for the ordinary little boy, everything pertaining to female gender role is brain coded as negative and unfit for use - it serves as a guide of what not to do as well as what to expect from others". (Money, 1972: 20) This complementation process is seen as a necessary element by Parsons and Bales (1955) who argue that neither boy nor girl can be adequately

socialized without access to and/or interaction with a parent or surrogate of the opposite sex whose role patterns he/she can never assume. This is to say, children learn their appropriate sex-typed behaviours by learning what not to do - i.e. through a process of negative reinforcement. When their behaviour is contrary to popular stereotypes, it is noticed more readily and punishment for the sex-inappropriate behaviour is usually immediate, although more severe and more physical for boys than for girls (Maccoby and Jacklin, 1974).

There has been a suggestion by several writers that there is in fact a "critical period" for the development of gender identity, a process which is similar to the imprinting process characterizing animal learning. This suggestion seems to be supported by Maccoby and Jacklin's finding that sex typed behaviours exist prior to the development of gender constancy as Kohlberg has indicated. Since children behave in sex-typed ways before they can consistently categorize all males and females, i.e. before they have learned conservation of objects, it would seem that the development of sex-identity is linked to the development of language. Thus, with the development of the "mind", according to Mead's formulations, and the incorporation of "significant symbols" comes the development of gender identity and the child, having the ability to interpret the meanings of others, is able to act accordingly. Daily experiences continually confirm this gender-identity which is later reconfirmed by hormonal changes at puberty.

These "meanings of others", in terms of gender-identity, are the definitional structures surrounding males and females. "Constructed" by society, they tend to order perceptions and to create differential

realities. Parents unknowingly and unquestioningly, train their sons and daughters in accordance to these expectations. Through the crystallization of these definitions into laws - moral and legal - the sex role stereotypes take on the appearance of a shared understanding and are therefore tacitly accepted. Legitimized by both structural and ideological features, they serve to limit and determine the choices and alternatives which both males and females have and consequently, put them into positions of relative strength and weakness such that men occupy positions of power and women those on the periphery of society. (Streiffert, 1974: 349) Thus, out of the few biological differences between the sexes, patterns of expected roles and behaviours evolve which are accorded differential values by the social order and which ultimately result in differential attainments and/or achievements.

Undoubtedly arising from the basic biological differences, i.e. that women menstruate, ovulate and lactate and that men impregnate, these definitions of men and women have tended to become polarized. Essentially this has meant that what man is, woman is not. Consequently, man has been seen as separate and distinct from woman so that one becomes the negation of the other. A definition which describes the sexes as direct opposites has obvious implications for their personality attributes and behavioural tendencies.

According to this dichotomization, a typology has been constructed in which the normal, healthy "masculine" male is one who is logical, aggressive, rational, unemotional, ruthless, tough, competitive and independent ... i.e. the "competency cluster" as defined and developed by Broverman et al (1970) or the "instrumental" attributes developed by Parsons and Bales. (1955) On the other hand, the normal, healthy

"feminine" female is one who is the exact opposite - quiet, passive, dependent, poised, obedient, domestic, nurturant and social ... i.e. the "warm/expressive cluster" of attributes. As constructed, these poles are perceived to be mutually incompatible resulting in a bifurcation of personality attributes. Consequently, if and when there are displays of cross-sex behaviours and attributes, they are seen as somewhat pathological and as having negative implications for the well-being and personal adjustment of the individual as well as for sexual behavioural preferences.

As defined, these personality attributes have given rise to sex-role stereotypes - fixed, static and mythical images which have served to constrict the development of the potentialities of both males and females and to circumscribe the nature of their activities. These stereotypes present considerable role conflict for both sexes, especially for women who often find themselves in a double-bind situation. Walum (1977), in her discussion on the definitions of masculinity and feminity, underlines the crucial dilemma facing women today. Based on research findings in which mental health clinicians were asked to identify those characteristics which would identify "normal, healthy, mature and competent" males, females and adults, she argues that there is, in fact, a double standard of mental health. "Put simply, for a woman to be considered mature and healthy in this culture, she must behave in ways that are considered socially undesirable and immature for a competent adult. There exists, then, a culturally constructed conflict situation for women. If they choose to act in the more socially desirable and adult ways preferred by their culture, they risk having their femininity questioned. If, however, they choose

to act in the prescribed feminine way, they are accepting a non-adult status". (1977: 10)

In order to define what the "prescribed feminine way" and "masculine way" is, Table 3.1 is provided to illustrate the cultural expectations of society for the appropriate male and female behaviour. From this table, it becomes increasingly clear why women find themselves in a conflicting situation and why they have begun to challenge the definition surrounding their nature.

Sex-role stereotyping, by defining appropriate temperments and behavioural tendencies, has implications for "intelligence" and achievement. If intelligent behaviour is defined as objective, rational, logical, decisive and unemotional and is accompanied by attitudes of competence, ambition, independence, worldliness and competitiveness, then it becomes obvious why women who have been typifed as the exact opposite, are considered not as intelligent as men and hence, inferior to them.

It would appear, then, that it is the myths - the ideologies - surrounding the nature of the sexes which ultimately become the decisive influence in the development of sex-linked behaviours. It is the norms and values arising therefrom that have circumscribed behaviours in such a way as to permit the accumulation of resources and the pyramiding of power thereby resulting in the superordinate and subordinate status of males and females respectively. In other words, it is cognitive control, buttressed by economic and political control, which has subordinated women and which has given rise to differential attainments and behaviours. Applicable even now, the following quotation of John Stuart Mill (1869) is most appropriate,

Table 3.1

CLINICAL JUDGEMENTS OF MENTAL HEALTH*

COMPETENCY CLUSTER: MASCULINE POLE IS JUDGED MORE SOCIALLY DESIRABLE	
FEMININE POLE	MASCULINE POLE
Not at all aggressive	Very aggressive
Not at all independent	Very independent
Very emotional	Not at all emotional
Does not hide emotions at all	Almost always hides emotions
Very subjective	Very objective
Very easily influenced	Not at all easily influenced
Very submissive	Very dominant
Dislikes Math and Science very much	Likes Math and Science very much
Very excitable in a minor crisis	Not at all excitable in a minor crisis
Very passive	Very active
Not at all competitive	Very competitive
Very illogical	Very logical
Very home-oriented	Very worldly
Not at all skilled in business	Very skilled in business
Very sneaky	Very direct
Does not know the way of the world	Knows the ways of the world
Feelings easily hurt	Feelings not easily hurt
Not at all adventurous	Very adventurous
Has difficulty making decisions	Can make decisions easily
Cries very easily	Never cires
Almost never acts as leader	Almost always acts as leader
Not at all self-confident	Very self-confident
Very uncomfortable about being aggressive	Not at all uncomfortable about being aggressive
Not at all ambitious	Very ambitious
Unable to separate feelings from ideas	Easily able to separate feelings from ideas
Very dependent	Not at all dependent
Very conceited about appearance	Never conceited about appearance

WARM-EXPRESSIVENESS CLUSTER: FEMININE POLE IS JUDGED MORE SOCIALLY DESIRABLE	
FEMININE POLE	MASCULINE POLE
Very talkative	Not at all talkative

Very tactful	Very blunt
Very gentle	Very rough
Very aware of feelings of others	Not at all aware of feelings of others
Very religious	Not at all religious
Very interested in appearance	Not at all interested in appearance
Very neat in habits	Very sloppy in habits
Very quiet	Very loud
Very strong need for security	Very little need for security
Enjoys Art and Literature very much	Does not enjoy Art and Literature very much
Expresses tender feelings easily	Does not express tender feelings at all

* Source: Walum, Laurel Richardson, The Dynamics of Sex and Gender: A Sociological Perspective, Chicago: Rand McNally College Publishing Company, 1977, p. 9. (Originally adapted from Broverman and Broverman, 1970.)

"Women are what we have required them to be"

... but, by the same token, men are also what we have required them to be. The home, the school and the other social institutions are guided by the belief systems, norms and values in socializing their young and boys and girls behave in the way in which they are expected to behave. Consequently, the self-fulfilling prophecy is in perpetual motion. Males and females, by defining themselves in the way that they have, come to believe and accept their social positions and their differences relative to each other.

Clearly, the socialization theories help to explain how it is that men and women, generation after generation, have assumed the same traditional ways of defining themselves and how they have perpetuated and reinforced the belief systems over time. The ideologies surrounding woman's inferiority have not been difficult to justify since sex is a manifest, distinguishing characteristic which has been used to define the sexes and to perpetuate their respective statuses relative to each other. Thus it is that the belief systems and the structural features of society feed upon each other to maintain the existing psycho-sexual relationships and thereby keep the mythology alive.

Summary

In summary then, as indicated in the review of the literature, the differences between males and females in the intellectual functions and respective achievements tend to be reflective of, and consistent with, societal expectations for appropriate sex-role behaviours. From the cradle onwards, boys and girls are encouraged to develop abilities and interests in those areas which are seen as relevant and preparatory

to their adult roles in society. Consequently, the aggregate differences which arise are in keeping with the norms and values of society.

Differential socialization experiences for males and females become manifest in the tendency for males to excel in the visual/spatial skills which, in turn, are reflected in their generally better performance on non-verbal IQ tests and in school subjects which are mathematically/scientifically oriented. Moreover, their superiority in these areas appears to be related to their analytic/field-independent mode of cognition. Girls, on the other hand, tend to excel in the verbal/communicative skills which are reflected in their generally better performance on verbal IQ tests and in school subjects which are related to these abilities, i.e. reading, spelling, grammar and language arts. In turn, these achievements appear to be related to their global/intuitive modes of cognition. Girls also tend to be better overall performers in school during the early years but gradually decline in the later years when they realize that intellectual pursuits are not valued for females.

With respect to the time-table of manifestation of consistent sex differences, it appears that the years of adolescence mark the most pronounced differentials. Prior to that, they are inconsistent and not found in all student populations.

It has also been found that high levels of intelligence for both males and females are associated with cross-sex typing. Particularly for females, evidence consistently shows that high intellectuality is correlated with "masculine" traits and an identification with a quantitative/analytic father.

It is anticipated therefore, that this group of gifted males and

and females will tend to follow somewhat similar achievement and ability patterns as have been found in general student populations, i.e. that girls will tend to be overall better performers than the boys in the early years of school, that girls will tend to perform better in the reading/language arts areas with respect to their own achievements, that boys will tend to perform better in the mathematics/science areas with respect to their own achievements in reading and language arts and that the years of adolescence (from grade seven onward) will mark the greatest differentials in male and female achievements. However, it is also anticipated that cross-sex typing in ability and achievement will be evident to a large extent since males and females of high ability have generally been found to be quite similar to each other and to be able to rise above the cultural sex-typed patterns of ability and achievement. Therefore, it is quite likely that the males and females in this sample will resemble each other in both ability and achievement and will not show the well-defined sex-typed patterns found within general populations. Furthermore, because gifted students tend to be of higher SES origin and are identified largely on the basis of their exceptional verbal skills, it is also anticipated that the gifted males and females will tend to have similar verbal abilities and achievements - similarities which may well be an artifact of the identification criteria and definition of "giftedness" and a function of their early socialization experiences into a formal linguistic code.

Arising from the review of the literature, the study therefore will address itself to the following questions in order to determine whether or not the ability and achievement patterns of this group of

gifted males and females replicate the sex-typed patterns found in average student populations or whether they transcend the traditional cultural sex-typed patterns of ability and achievement:

(1) Is there a difference in the proportion of males and females identified as "gifted" at the varying grade levels throughout the EPSB? Is this particular male/female ratio similar at the elementary, junior and senior high school levels?

(2) What is the general level of academic achievement of this group of gifted students? Does the level of achievement remain fairly constant over the years or does it increase/decrease as the students progress to the higher grades?

(3) Is there a difference in regular school performance between males and females and is this difference consistent regardless of subject area? That is, is there a difference between male and female achievement in the Language Arts? in Math/Science? Do the females tend to perform better than the males in Language Arts and the males better than the females in Math/Science?

(4) Is there a difference in standardized test achievement between the gifted male and female groups? Is this difference consistent over the years or does the differential widen/narrow between the sexes as they progress to the higher grades?

(5) Is there a difference in measured ability test scores between the gifted males and females? Are these differences in ability consistent or do ability test scores increase/decrease over time? Are there any patterns common to both gifted males and females?

(6) Are these patterns of ability and achievement similar for all gifted males and females across all grade levels, i.e. are there characteristic patterns defining the elementary, junior and senior high groups of gifted students?

CHAPTER IV

RESEARCH PROCEDURES

This chapter describes the procedures used in the collection and analysis of data in order to identify and examine the differentials in the patterns of ability and achievement between gifted males and females in the Edmonton Public School system.

Definition of Terms

A. Gifted

Though cognizant of the widespread critical concern and doubt which has been cast upon the IQ and its use in measuring a student's ability, it nonetheless forms one of the criteria by which the gifted are defined in this study. Since the students constituting the sample have already been identified as "gifted" by the E.P.S.B., the system's use of the IQ test score as an identifying feature of "giftedness" thereby necessitates its acceptance as a measure of "giftedness" for the purposes of this study.

The gifted, therefore, are defined by the same criteria used by the school system, these being:

(1) an IQ test score of 130 or above (scored on either a group IQ test or an individual IQ test)

(2) superior achievement on the standardized achievement tests (scores approximately two standard deviations above the mean)

(3) superior classroom performance

(4) ability to work independently with little supervision

B. Ability

Ability is similarly defined and measured in terms of IQ test scores since operationalization of the concept must conform to that used by the school system.

The E.P.S.B. administers the Canadian Lorge Thorndike Ability test (CLT) to all grade three, six and nine students within the system. It is a group ability test in which scores are recorded separately for the verbal and non-verbal batteries, i.e. a student can achieve 132 in the verbal sub-test and 141 in the non-verbal sub-test.

Because each sub-test measures a different set of intellectual functions, the use of CLT test scores in this study is particularly advantageous since its format permits the comparison of verbal and non-verbal test scores for within-group and between-group analysis for male and female cohorts.

Ability, then, is defined as that which is measurable by IQ tests and the Canadian Lorge Thorndike test (CLT) constitutes the instrument by which ability will be measured in this study.

C. Achievement

Academic achievement in this study will be measured by (1) the scores obtained on achievement tests and (2) the scores obtained on teacher graded tests.

(1) Achievement tests

Achievement tests are standardized tests given to students to measure their level of knowledge and skill acquisition of the curricular objectives within a given school year. They are published skill tests which supplement teacher-made tests in evaluating student progress and

which are prepared to sample as extensively as possible those particular concepts/skills which have been taught over the course of the school term. In this way, they measure only school-learned skills and do not measure skills/concepts not taught within the classroom setting. They are normed to indicate the range of scores among typical students in each grade and therefore, permit cross-comparison with other classes and/or schools within the system.

The E.P.S.B. develops and publishes its own standardized math tests at the elementary level although they are not compulsory on a system-wide basis. Only grade three's and six's write the tests system-wide; the other grades are optional. However, most elementary schools choose to administer the math tests since they provide objective measures of the levels their students are functioning and of cross-school/cross-class comparisons.

The E.P.S.B. also uses the Stanford Reading Achievement tests (normed to Edmonton populations) at the elementary level. As with the math tests, there are different forms for the different grades. Because all students ultimately will have written the same tests, although in different years, comparison of SAT scores for the different groups is thereby facilitated.

No other standardized tests are used at the elementary level on a system-wide basis and as a consequence, basic skills in spelling, science and social studies are not tested.

This same situation exists at the junior and senior high levels. Though numerous standardized tests are available, none are being used on a regular system-wide basis with the result that some students have achievement test scores, others do not. This inconsistency in

standardized test administration thereby prevents the use of standardized achievement test scores as a measure of achievement at the higher grade levels.

Consequently, the two standardized tests (the E.P.S.B. Mathematics Test and the Stanford Reading Achievement Test (S.A.T.)) being used at the elementary school level constitute the measure of achievement in the math and reading subject areas for this study. However, it is a measure which is limited to the description of achievement patterns at the elementary level only.

(2) Teacher-graded tests (regular school performance)

Whereas achievement test scores tend to be relatively objective measures of students' achievement, teacher-graded test scores tend to be somewhat more subjective in that teachers' prejudices, biases and interests often enter into the grading of the students' work. Consequently, student grades are more likely to reflect the teacher's perceptions of student attitudes, willingness to work, to obey and to achieve rather than their actual ability. The difference between A or an A-, or between an A- and B+, is very difficult to determine or even to justify and one questions the standards by which teachers have arrived at these grades. Therefore, it is difficult to determine how reliable and valid the reported grades for the sample will be. It is assumed that teacher biases will have affected the grade scores somewhat but that these effects will likely be more positive than negative given the high ability levels of the gifted students. Since teachers know and believe that the students are bright, they will probably have inflated their scores more than they might have had if the students had not been identified

as "gifted".

School achievement, then, is measured by the students' year-end grades as they have been recorded in the students' cumulative records. These teacher-graded marks constitute the major source of data for the examination of achievement patterns for all students in the sample, whether of elementary, junior or senior high school level.

The Sample

The analysis is based upon a set of data for a total of 432 students from grades six through to twelve within the E.P.S.B. who have been identified as "gifted" and who have participated in the Gifted Program at some point in their formal schooling, albeit their respective involvements have varied from a minimal one year to a maximal four-year period.[1]

The sample is a relatively homogeneous and highly selective one and therefore, does not claim to be representative of the total gifted population within the entire school system nor to be one of random selection. Because the purpose of the study is to describe the patterns of ability and achievement of the students identified by the system, no attempt will be made to generalize to the total gifted population, nor for that matter, to other gifted populations.

A. Sample Characteristics

The relative homogeneity of the sample stems from the identification criteria used by the school system to identify students for gifted programming. It will be recalled that these criteria are:

[1] Please see Appendix I for a brief description of the E.P.S.B. Gifted Program Operational guidelines and historical development.

(1) an IQ score of 130 or more

(2) superior performance in the regular classroom

(3) superior achievement in the standardized tests

(4) ability to work independently with little supervision

(5) adequate social and emotional maturity

In essence, the students are superior achievers as well as high IQ students who not only tend to be highly motivated but who also value and seek academic success. Those high IQ students who are "under-achievers" or who have social and/or emotional problems are not generally recommended for gifted programming primarily because the type of program being offered is unable to accommodate them. Thus, the selection procedures effectively limit the program to those with high motivation to succeed and with high achievement expectations. Consequently, any differentials to be found between males and females cannot be explained in terms of differential levels of achievement or ability at the time of entry into the program since theoretically the same identification criteria have been applied to all students.

Originally a total of 945 names had been obtained from the Gifted Program files but of this total, 340 students were immediately excluded. They were the most recent nominees to the program and were registered either in grade three, four or five at the time of the study. Since a minimum of two sets of ability and achievement test scores were required for each variable being examined, they were excluded since they did not meet this requirement.

A further 173 students were similarly excluded although their

exclusion was not by choice. These students were the ones who were no longer in the system and whose school records were not available for data collection. This data loss was particularly regrettable since the majority of this group was initially involved in the Pilot Project Phase during 1970-1973. At that time, students had been identified for the Gifted Program on the basis of IQ scores which were 140^{+} an IQ range in which only a mere .5 - 1% of a given student population may be found. Since this group tended to be of generally higher IQ ability than the majority of the final sample, their inclusion may have yielded somewhat different patterns of ability and achievement than those ultimately obtained.

The remainder of the original total - 432 students - thereby constituted the sample under study. They were distributed across all grade levels from grade six through to twelve with the largest percentage (28.2%) in grade six, the next largest group in grade seven (25.9%) and the third largest in grade twelve (13.9%). In total, the sample consisted of 55.6% males and 44.4% females - a ratio which is surprisingly similar to the one which would have been obtained if all 945 students had been included (53.9% male and 46.1% female). Table 4.1 demonstrates the actual distribution of the sample by grade and by sex.

The significantly higher number of students in grade six and seven is the result of a change in administration of gifted programming within the E.P.S.B. In September 1976, a new policy was implemented which concentrated gifted programming at the elementary level and which decentralized programming at the higher grade levels. Consequently, the grade six and seven students were the ones who had

Table 4.1

GIFTED SAMPLE DISTRIBUTION BY GRADE AND BY SEX

Grade	Sex		Totals
	Male	Female	
6	68	54	122 (28.2%)
7	66	46	112 (25.9%)
8	27	13	40 (9.3%)
9	18	14	32 (7.4%)
10	15	19	34 (7.9%)
11	15	17	32 (7.4%)
12	31	29	60 (13.9%)
	240	192	432 (100%)
	(55.6%)	(44.4%)	

been identified for programming after the administrative changes.

The relatively higher percentage of grade twelve students compared to those in grade eight through to eleven can be accounted for by two reasons:

(1) It had been the policy of schools offering Gifted programs prior to 1976 to select students from the highest grade level within the division, i.e. in junior high where grades seven, eight, and nine were offered, students from grade nine had been selected in preference to those from grade seven and eight for the reason that it was felt that the students in grade seven and eight would have an opportunity to participate in the program the next school year or the year following. Related to this, students took turns participating in the program so that if a student attended one given year, he could not attend the following year. This policy had its advantages in that more students were able to sample gifted programming but it also had the distinct disadvantage in that it served to suggest to the students that they were "gifted" one year but not quite as "gifted" the following year and that their own educational needs had to be subordinated to others.

(2) A small number of students who had already completed grade twelve the previous year were also included. It was felt that because they had the most complete academic records, their inclusion would provide some of the most informative data on the patterns of ability and achievement over their growth cycle.

Data Collection

All data required for the study was available from the Edmonton Public School system although some of the data was on computer file, some in Gifted Program files, some in Tests and Measurement files and the

remainder in the student cumulative records in the various home schools within the system. Access to data was granted by the Directors of the respective departments involved, i.e. the Department of Research and Evaluation, Tests and Measurement and Special Education. The letters requesting and granting authorization for the research study are found in Appendix II.

Since each of these sources was used in the collection of data, the type of data obtained from each will be summarized briefly.

A. Gifted Program Files

Two types of data were obtained from Gifted Program files:

(1) Names of all students who had participated in gifted programming within the system. These names accessed information to student ID numbers which in turn accessed information from the computer data bank on the sex, grade and school the students were attending.

(2) Class registers of all Gifted Program classes from which male/female ratios could be determined for the respective grade levels for the school terms 1974-1978.

B. Computer Files

The type of data obtained varied according to the grade level in which students were registered. For all students at the elementary, junior and senior high levels, their sex, grade, school and address was obtained.

For students at the junior and senior high level whose schools utilized computerized reporting procedures, year-end school grades were also available.

C. Cumulative Records in School Files

Individual student records provided the main source of data

required for analysis. The specific data obtained from each cumulative record was:

(1) E.P.S.B. Standardized Math test scores for the years 1974-1978 (available only for the grade six to nine students since these tests had not been given during the years that the high school students were in elementary school)

(2) Stanford Achievement Test Scores (S.A.T. - Reading) for the years 1974-1978 (available only for the grades six to nine students for the same reason cited above)

(3) Grade scores for regular classroom performance from grade three onwards in reading, mathematics, social studies and science.

(4) Canadian Lorge-Thorndike Ability Test Scores, verbal and non-verbal battery scores at the grade three, six and nine levels.

This data was obtained in two ways:

(1) Student Information Forms (see Appendix III) were sent to principals of local schools to be completed and returned with all relevant data contained within. Information forms were sent only to those schools having no more than six gifted students registered. By limiting the number of data sheets principals would have to complete, a minimal time commitment was being requested and a higher rate of return was thereby expected.

(2) In-person data collection was used to collect the remaining data from home schools having more than six gifted students registered.

D. Tests and Measurements Office, E.P.S.B.

This source of data was used primarily to obtain data which was unavailable in local school files either because teachers had neglected to record the test scores or because some of the schools had failed to return the student information sheets. Only standardized test-scores and CLT ability test scores from 1975 onwards were

available with the result that there was a considerable loss of data for those students whose home schools neglected to respond.

E. Henderson Directory

This source was used to obtain data not available in student cumulative records. In order to determine the SES origin of the gifted student population, the father's occupation was required. Because this information was no longer being recorded in the student records, the Henderson Directory was used to locate the father's occupation and/or to update the information which already was on file.

Once the father's occupation was known, the SES class origin was determined by using Blishen's revised scale of occupational rankings (1976) and classifying them within his six class categories.

Data Preparation

All raw data from the individual student information forms for each student in the sample and from the computer print-outs was coded for each of the variables and then transferred to IBM cards for analysis. The coding guide which was used has been included in Appendix IV.

In total, fifty-five variables were coded for the sample although the number of variables differed for the three groups. For the elementary group, only twenty-six of the variables were applicable; for the junior high group, thirty-seven of the variables were used and for the senior high group, all fifty-five variables applied. The reason for the differing number of variables for each of the groups arose from the fact that grade scores at the senior high levels or at the

junior high levels were not yet available for the elementary groups, i.e. a grade six student could not have grade nine or grade eleven scores, and similarly, a junior high school student could not have grade eleven or twelve scores. Therefore, each group had a varying number of scores which were grade-dependent.

Analysis of Data

The analysis of data consisted mainly of descriptive statistical procedures generally utilized in survey and/or trend studies. Thus, the computation of ratios, frequency distributions, percentages, averages, means and measures of dispersion formed the analytic procedures used in this study. Each of the groups, i.e. the elementary, the junior high and the senior high, were treated separately although between-group comparisons were also made. However, these comparisons were not statistical in nature since it was felt that the substantive changes over the growth cycle in the different patterns of achievement and ability would be more indicative of differences between males and females than would mere differences in test means.

Each sub-problem required a slightly different mode of analysis. The following discussion will briefly survey the way in which the data was treated for the specific sub-problems for the three groups within the gifted sample.

For the first sub-problem - to determine whether a differential existed in male/female ratios in gifted programming - the computation of ratios, percentages and measures of dispersion, where applicable, were found. Each level of schooling was considered separately, then

cumulatively. A further division was made at the elementary level in which grades three/four and grades five/six constituted other sub-groups in order to determine whether the male/female ratio was the same at the lower elementary level as it was at the middle elementary level.

The second sub-problem was to determine whether there was a differential in the patterns of achievement between the gifted male and female cohorts as measured by standardized tests. Since the senior high school group lacked this data, the analysis was restricted to the elementary and junior high school groups. The percentage differentials were found by cross tabulation of means by sex and by grade and interpreted in light of recent research findings regarding male/female academic differences in reading and mathematics subject areas. Comparison of the means and standard deviations for the respective male and female cohorts over the grade three to six time period followed in order to determine whether there was a consistent pattern of achievement for the males and females or whether there was a trend towards change in their respective patterns of achievement.

The third sub-problem was to determine whether there was a differential in regular classroom performance as measured by year-end grade scores. Because teachers used different grading systems it was necessary to convert the scores to a common and uniform grading system. (See Coding Guide, Appendix V to see how this was done.) Primary teachers, by and large, had used letter grades (A, B, C, D) and often used only S (Satisfactory), E (Excellent) or NS (not satisfactory). The intermediate elementary teachers used either letter grades or percentages whereas the junior and senior high teachers used almost exclusively percentages in recording year-end grades. The conversion of

all scores was to a percentage system.

The year-end grade scores in reading and social studies were then averaged to constitute one score for the verbal/communicative type of subjects, i.e. the ones in which girls are known to excel, and the year-end scores for mathematics and science were similarly averaged to yield one score in the spatial/mathematical type of subjects, i.e. the ones in which boys are known to excel. Thus, for each year from the third grade onward for the students in the sample, two scores were obtained which were then aggregated separately for each of the three cohorts for within and between group comparison.

The last sub-problem was concerned with whether there was a differential in ability levels for the respective male and female cohorts and whether the differential remained consistent over the years (grades three through grade nine). In order to examine this problem, IQ test scores were first located on an interval scale ranging over five IQ points, i.e. a student scoring 134 IQ in the verbal battery was located in the 130-134 IQ category. Given the non-fixed nature of IQ scores and their elastic limits, it was felt that the IQ scores should be located in categories which ranged over a number of scores rather than assuming that they constituted unitary, fixed measures. The scores were then cross tabulated by sex and grade in order to determine both the distribution of scores for the male/female cohorts and the percentage differentials existing between them. Ability patterns for each male/female cohort within each sub-group were then graphed to identify any changes which had occurred between grades three and nine. The profiles thus obtained facilitated inter and intra-group comparisons. Given the nature of the study and inherent

difficulties of controls in post-facto studies, statistical differences were not sought.

Limitations

This research study is essentially one of exploration and is therefore limited to the description of various trends observed in the patterns of ability and academic achievement between a group of identified gifted males and females within the Edmonton Public School system. Because it has used secondary data to analyze the particular trends within the respective groups, it is able only to describe the trends and not to account for the reasons causing them. However, the nature of the study does not preclude the suggestion of possible explanations. In fact, according to Hyman (1972), one of the major benefits of secondary analysis is that the empirical evidence of change which trends and/or patterns demonstrate, provide the foundations for theory building and the broadening of substantive knowledge. It leads the way, therefore, to a better understanding of the processes involved in change and to new directions for further research. As he states,

> "Secondary analysis benefits science in many ways, all stemming from one fundamental feature of the method. It expands the types and number of observations to cover a wide array of social conditions, measurement procedures and variables than can usually be studied by primary studies. Thus it produces a more comprehensive and definitive empirical study of the problems the investigator has formulated ... we are stimulated to think about otherwise forgotten problems and also forced in the direction of higher levels of abstraction". (1972: 11)

However, the limitations of survey analysis are also the limitations of this study. Because of its nature, one of the major limitations is the weakness in controls. Whether testers in the past used similar testing environments, whether the instruments were treated similarly and whether the scores were evaluated according to the same criteria become serious concerns. Though an equivalence of testing instruments has been maintained in this study to the degree which it has been possible, the differences which have been obtained between the various groups must be interpreted cautiously since it cannot be known definitively whether the differentials obtained in this study reflect actual changes in achievement behaviours or whether they are mere artifacts of the measuring instruments.

Another limitation of the study which arises from its ex-post facto nature is that a systematic loss and/or incomplete data was encountered for many students. This resulted in extremely small cell sizes for certain variables thereby reducing the reliability of the generalizations. These losses occurred for the following reasons:

(1) teachers had neglected to record the test scores at the end of the year in the Student's Cumulative record.

(2) students were absent during the times that the tests were written.

(3) students misinterpreted questions on the tests and thereby invalidated their test scores.

(4) students moved out of the city and their records were no longer available for data collection.

(5) standardized tests were not given on a compulsory system-wide basis and not all students in the sample had the same set of test scores for comparative purposes.

(6) students purposely did not follow instructions on some of the tests (personal observation of certain gifted students writing tests saw them "playing games" or "creating designs" on their computerized answer sheets rather than seriously answering the questions).

These "gaps" and/or discontinuities in the data file, therefore, constitute a major limitation in the study.

A third limitation arising out of the nature of survey analysis is that the study was not designed to prove or disprove a given set of hypothesis nor to subject the data to extensive tests of statistical significance. Part of this derives from the non-random nature of the sample which had been comprised of students who had participated in E.P.S.B. Gifted Programs and for whom sufficient data could be obtained. Thus, it did not use random sampling techniques. Although the absolute number of students within the sample was large (432), in many cases there were not enough at the same grade level or with the same data available to permit randomization within the sample. Consequently, the study is limited to describing the trends characterizing this gifted population only.

There is one other limitation which handicaps this study to an extent but is one which tends to characterize numerous sociological studies, i.e. it uses the same measures of ability for research analysis that it has criticized. The problematic nature of IQ tests and even of teacher-graded tests is well recognized - however, the reality constraints ultimately direct the type of instruments to be used in research analysis. Because the "bucket theory of intelligence" still persists and educators continue to use IQ test scores as screening devices for grouping practises, the use of IQ scores as

measures of ability is more or less pre-determined for researchers. In light of the recent controversy regarding the heritability of IQ, it is perhaps timely that more studies be done examining the inherent contradictions of "IQism" by using its assumptions and its measures as problems to be resolved.

CHAPTER V

FINDINGS

This chapter discusses the findings of the analysis in five major sections: (1) male/female ratios in E.P.S.B. Gifted Programs (2) SES origins of the gifted students in the sample; (3) regular school performance results for the elementary, junior and senior high school gifted males and females; (4) standardized test results for the elementary and junior high school gifted males and females and (5) ability test results for the elementary, junior and senior high school gifted males and females.

The findings for each of three cohorts are discussed separately although cross-group comparisons are made within each section to provide a more comprehensive view of how each cohort compares with the other.

Prior to discussing the findings, however, several important points must be mentioned. Firstly, the three cohorts in the sample, i.e. the elementary, junior high and senior high, consist of students who are currently enrolled in those particular levels of schooling. Thus, the elementary cohort consists of students who are presently in elementary school, the junior high cohort consists of students who are presently in junior high school and the senior high school cohort consists of students who are presently in high school.

Secondly, because the availability of achievement and ability test scores for the different cohorts is grade-dependent, it is important to note that cell sizes for the respective variables vary according to the number of students currently at the grade level being

considered.

Male/Female Ratios

In order to determine whether or not males have predominated in E.P.S.B. Gifted Programs, enrollment records were obtained for the years during which programs were operational. Male/female ratios thus determined were based upon the aggregate of all students who had been involved in gifted programming whether or not they were currently in the system whereas the remainder of the analysis in this chapter was based upon data for only those students who were in the Edmonton Public School system at the time of the study and whose academic records were accessible to the researcher.

As Tables 5.1 and 5.2 demonstrate, males consistently outnumbered females in E.P.S.B. gifted programs although 1977/78 showed a reversal of this tendency. Reference to Table 5.3 shows that this reversal in male/female ratios in 1977/78 could be attributed to the larger number of females than males at the grade three/four level, a male/female ratio which was also found in 1976/77 and 1977/78. Interestingly enough, at the grade five/six level there were more males than females participating in gifted programs during those same years.

Table 5.4 shows the male/female ratio at the junior high school level. As can be seen, males predominated in junior high gifted programs approximately on a 2:1 basis, a much larger differential between males and females than at the elementary level. Only in 1975/76 were there more females than males at the junior high school level.

These shifts in male/female ratios observed in 1975/76 for the junior high cohort and in 1977/78 for the elementary cohort are not easy to explain particularly since the identification criteria have

Table 5.1

TOTAL MALE/FEMALE RATIOS IN
GIFTED PROGRAMS BY SEX AND BY YEAR

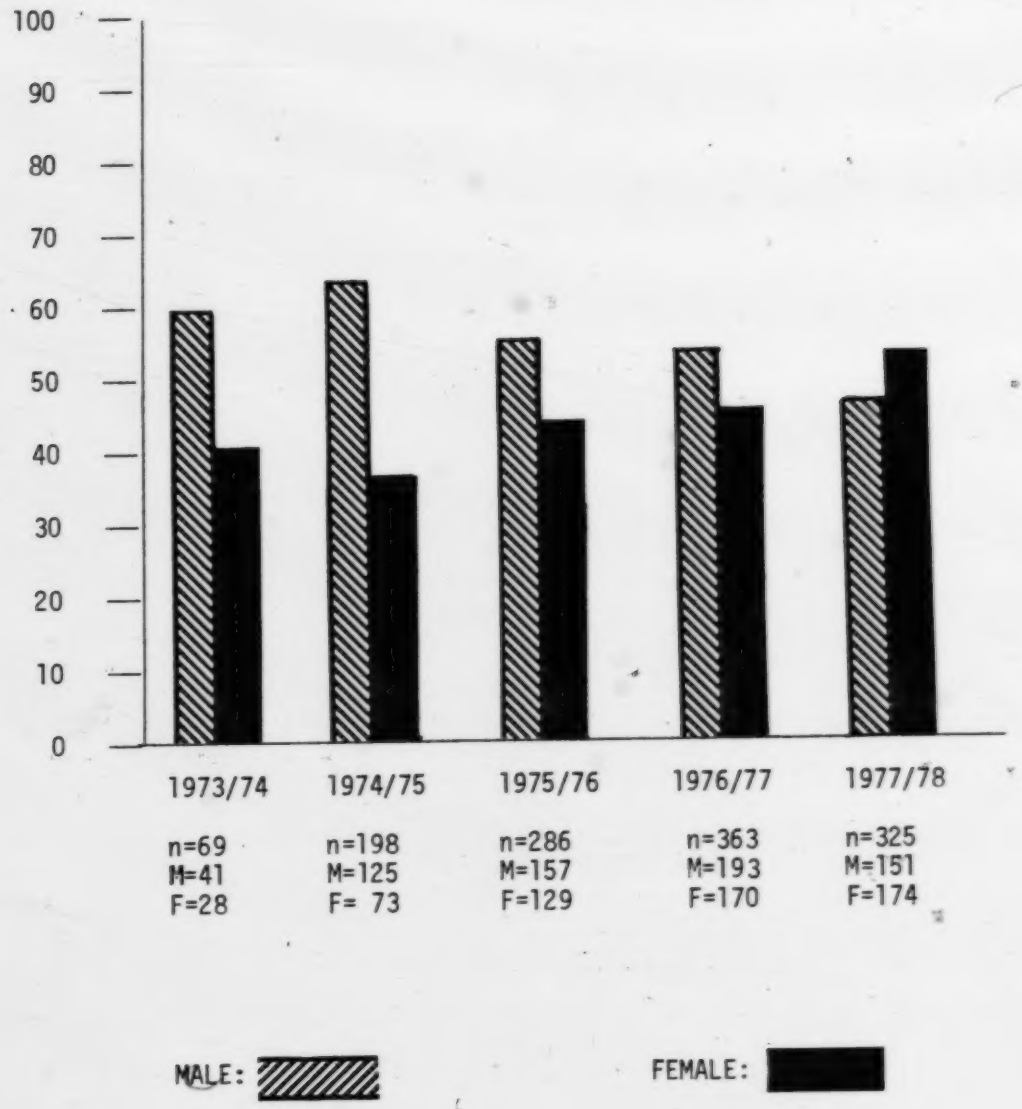


Table 5.2

FREQUENCY DISTRIBUTION OF ELEMENTARY STUDENTS ENROLLED IN GIFTED PROGRAMS BY SEX AND BY YEAR

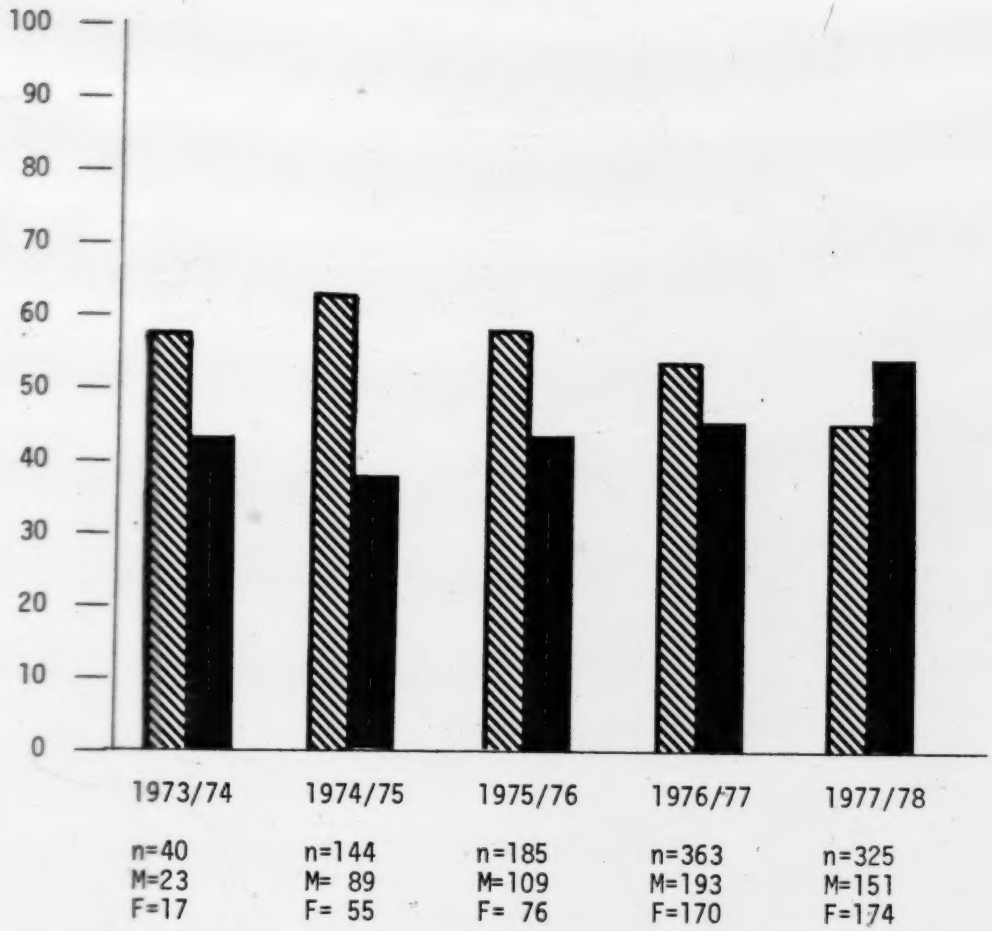


Table 5.3

FREQUENCY DISTRIBUTION OF PRIMARY AND INTERMEDIATE ELEMENTARY STUDENTS ENROLLED IN GIFTED PROGRAMS BY SEX AND BY YEAR

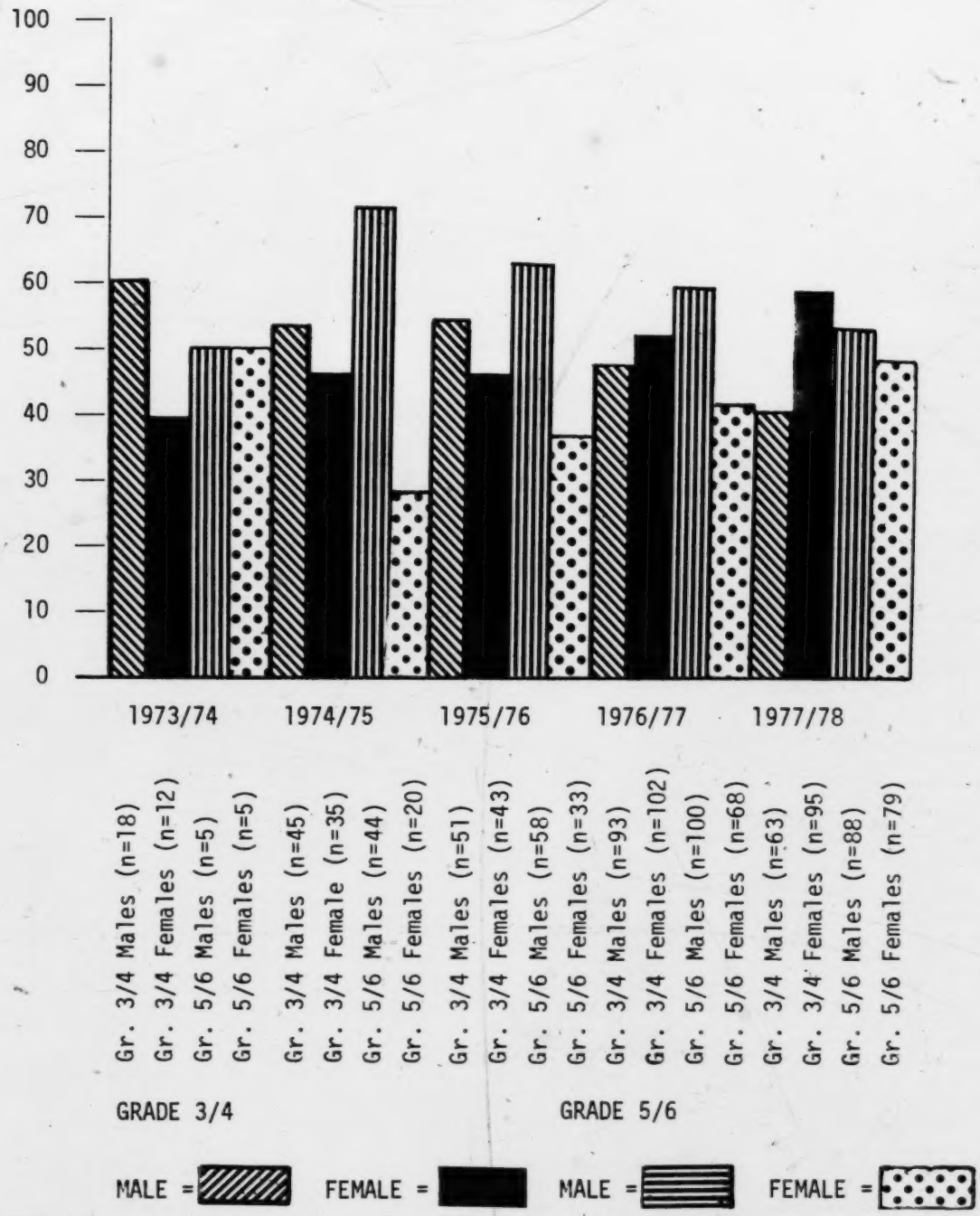
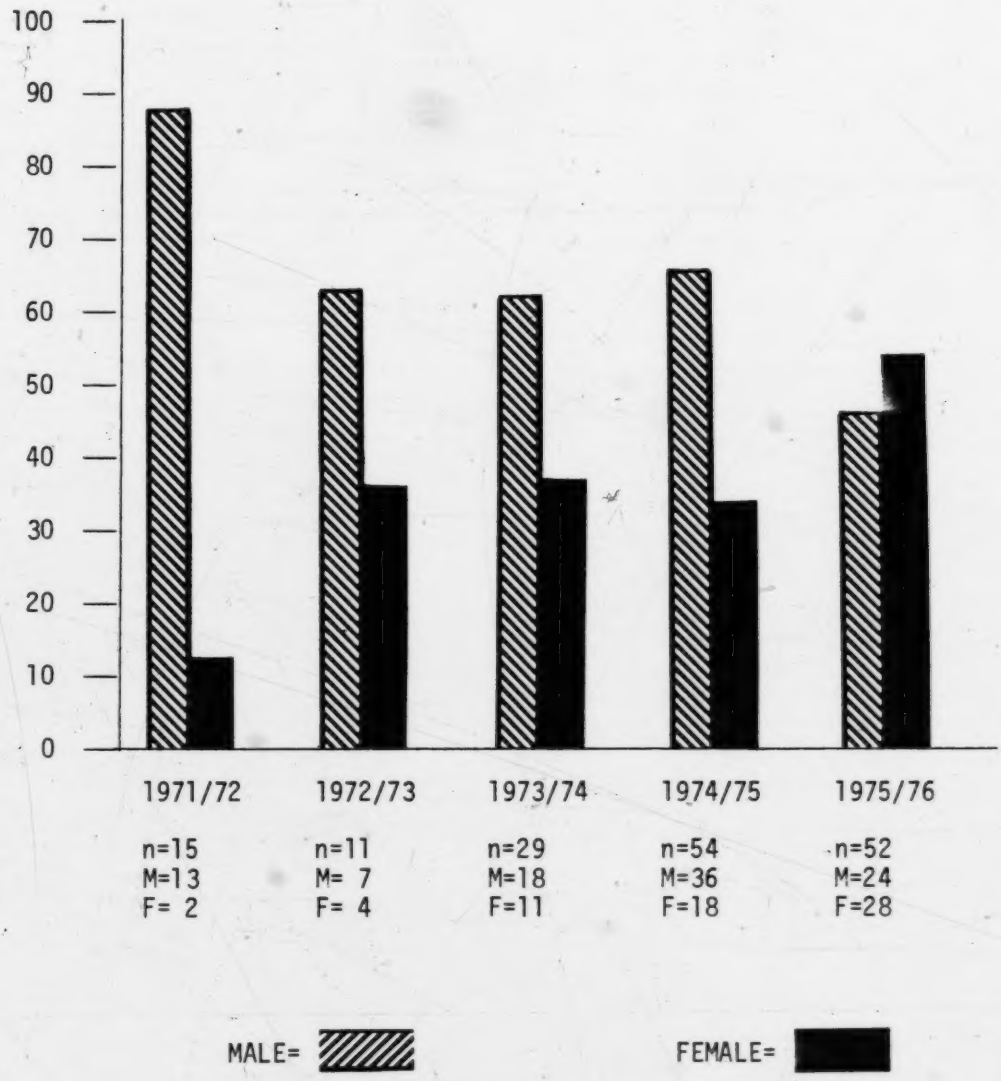


Table 5.4

FREQUENCY DISTRIBUTION OF JUNIOR HIGH STUDENTS ENROLLED IN GIFTED PROGRAMS BY SEX AND BY YEAR



not changed to any great extent. 1974/75 marked the year during which programs were first expanded and the IQ criterion was lowered slightly from 135 to 130; however, the other criteria concerning achievement in both the regular classroom work and standardized test results did not change. The reversal of male/female ratios appears to indicate that there may be a greater awareness by teachers of female ability and that girls may no longer be overlooked as possible candidates for gifted programs.

Complete enrollment records for senior high school gifted programs during the same time period were largely unavailable. Consequently, male/female ratios could not be determined for this level of schooling.

SES Origins

Table 5.5 demonstrates the general tendency for the gifted sample to be primarily of higher SES origin with 68.2% of the total sample being of Class I and II origin compared to only 31.9% of Class III - VI origin - a finding which is wholly consistent with general findings on the SES origins of gifted students.

Differences between males and females were not large although there was a slight differential of 3.4% favouring females in Class V and VI SES categories. These numbers are too small to make any conclusive statement although it seems to support the general research findings which show that lower class girls tend to achieve better than lower class boys.

A. Between-Group Comparisons

Examination of Table 5.6 shows that all three cohorts were

Table 5.5

SES BACKGROUND OF TOTAL GIFTED SAMPLE

(n = 380)

Father's Occupation	Sex		Totals
	Male	Female	
Class I (Professional)	70 (32.8%)	55 (32.9%)	125 (32.9%)
Class II (Management/Owners)	79 (37.1%)	55 (32.9%)	134 (35.3%)
Class III & IV (White Collar Workers)	47 (22.1%)	38 (22.8%)	85 (22.4%)
Class V & VI (Unskilled/Semi-skilled Manual)	17 (8.0%)	19 (11.4%)	36 (9.5%)
	213	167	380 (100%)

Number of missing observations = 52 (or 12%)

Table 5.6

SOCIOECONOMIC BACKGROUND OF GIFTED STUDENT COHORTS
BY DIVISION AND BY SEX

Father's Occupation	Total Sample n = 380		Elementary n = 100		Junior High n = 166		Senior High n = 114	
	Male n = 213	Female n = 167	Male n = 57	Female n = 43	Male n = 101	Female n = 65	Male n = 55	Female n = 59
Professional (Class I)	32.9%	32.9%	29.8%	27.9%	30.7%	32.3%	40.0%	37.3%
Managerial/Entrepreneurial (Class II)	37.1%	32.9%	35.1%	37.2%	39.6%	29.2%	34.5%	33.9%
Low White Collar Workers (Class III & IV)	22.1%	22.8%	22.8%	25.6%	22.8%	23.1%	20.3%	20.3%
Unskilled/Skilled Manual Workers (Class V & VI)	8%	11.4%	12.3%	9.3%	6.9%	15.4%	5.5%	8.5%

primarily of higher SES origin although the elementary cohort had the largest number of lower class participants. It is also noted that in both the junior and senior high school cohorts, more females than males were of lower class origin whereas the distribution of lower class males and females was approximately the same in the elementary group.

Regular School Performance

A. Elementary Cohort

Year-end scores for the 122 grade six elementary students (sixty-eight or 55.7% male and fifty-four or 44.3% female) were largely unavailable since teachers were still in the process of testing and/or determining marks at the time data was being collected. As a consequence, the small cell sizes prevent any conclusive findings regarding the relative achievements of the elementary male and female cohorts.

1. Elementary School Performance

Table 5.7 demonstrates that for the small group of students for whom scores were available, sex-typed effects were evident for both males and females although none of the differentials in their respective achievements were large. In both grade three and six, girls performed better than the boys in Language Arts/Social Studies (LA/SS), reflected both in the percentage of females scoring above eighty percent and in group means. Girls also performed better in LA/SS than they performed in Math/Science (MA/SC). However, with only seventeen and eleven females at the grade three and six levels respectively, it is difficult to state whether or not this will hold

Table 5.7

DISTRIBUTION OF ELEMENTARY GRADE SCORES FOR ELEMENTARY COHORT BY GRADE AND BY SEX

Grades Achieved	Grade 3 Language Arts/Social St			Grade 3 Math/Science			Grade 6 Language Arts/Social St.			Grade 6 Math/Science		
	Male (n=24)	Female (n=17)	Total (n=41)	Male (n=24)	Female (n=17)	Total (n=41)	Male (n=17)	Female (n=11)	Total (n=28)	Male (n=17)	Female (n=11)	Total (n=28)
90-100%	45.8% (n=11)	76.5% (n=13)	58.5% (n=24)	79.2% (n=19)	70.6% (n=12)	75.6% (n=31)	23.5% (n=4)	36.4% (n=4)	28.6% (n=8)	35.3% (n=6)	27.3% (n=3)	32.1% (n=9)
80-89%	33.3% (n=8)	17.6% (n=3)	26.8% (n=11)	16.7% (n=4)	17.6% (n=3)	17.1% (n=7)	64.7% (n=11)	54.5% (n=6)	60.7% (n=17)	47.1% (n=8)	54.5% (n=6)	50.0% (n=14)
70-79%	20.8% (n=5)	5.9% (n=1)	14.6% (n=6)	4.2% (n=1)	11.8% (n=2)	7.3% (n=3)	11.8% (n=2)	9.1% (n=1)	10.7% (n=3)	17.6% (n=3)	18.2% (n=2)	17.9% (n=5)
60-69%	--	--	--	--	--	--	--	--	--	--	--	--
50-59%	--	--	--	--	--	--	--	--	--	--	--	--
$\bar{X}$ * (expressed in percentages)	82.5%	87.1%	84.4%	87.5%	85.9%	86.8%	81.2%	82.7%	81.8%	81.8%	80.9%	81.4%

*Means rounded off to the nearest tenth.

true for a larger group of students.

The elementary gifted boys, on the other hand, performed consistently better than the girls in MA/SC at both grade levels and better in MA/SC with respect to their own performance in LA/SS. However, their grade six LA/SS was fairly similar to the girls' LA/SS performance and also to their own MA/SC performance.

B. Junior High School Cohort

The junior high school cohort of gifted students consisted of 184 students in total. 112 (or 60.3%) were in grade seven, forty (or 21.7%) were in grade eight and thirty-two (or 17.5%) were in grade nine. Within the total cohort, there were 111 males (or 60.3%) and seventy-three (or 39.7%) females - a discrepancy in male/female ratios which is not totally explicable but is in part due to the disproportionate number of males identified for gifted programming during the years in which these students had been involved, i.e. during their elementary grades. As Tables 5.2 and 5.3 showed, elementary class enrollments in the years prior to 1977/78 were predominantly male. Therefore, the male/female ratio in the junior high cohort seems to be a residue of elementary selection procedures.

Elementary grade scores for the junior high cohort were available for approximately eighty percent of the group. The students for whom scores were unavailable were those whose home schools neglected to return the data information sheets which had been mailed to them.

1. Elementary School Performance

Examination of Table 5.8 shows better overall elementary school performance by the junior high gifted girls compared to the junior

Table 5.8

DISTRIBUTION OF ELEMENTARY GRADE SCORES FOR JUNIOR HIGH COHORT BY GRADE AND BY SEX

Grade Achieved	Grade 3 Language Arts/Social St.			Grade 3 Math/Science			Grade 6 Language Arts/Social St.			Grade 6 Math/Science		
	Male (n=91)	Female (n=56)	Total (n=147)	Male (n=91)	Female (n=54)	Total (n=145)	Male (n=93)	Female (n=59)	Total (n=152)	Male (n=93)	Female (n=59)	Total (n=152)
90-100%	46.2% (n=42)	57.1% (n=32)	50.3% (n=74)	56.0% (n=51)	66.7% (n=36)	60.0% (n=87)	19.4% (n=18)	28.8% (n=17)	23.0% (n=35)	19.4% (n=18)	23.7% (n=14)	21.1% (n=32)
80-89%	30.8% (n=28)	33.9% (n=19)	32.0% (n=47)	20.9% (n=19)	22.2% (n=12)	21.4% (n=31)	52.7% (n=49)	67.8% (n=40)	58.6% (n=89)	62.4% (n=58)	62.7% (n=37)	62.5% (n=95)
70-79%	23.1% (n=21)	8.9% (n=5)	17.7% (n=26)	23.1% (n=21)	11.1% (n=6)	18.6% (n=27)	24.7% (n=23)	3.4% (n=2)	16.4% (n=25)	12.9% (n=12)	11.9% (n=7)	12.5% (n=19)
60-69%	--	--	--	--	--	--	3.2% (n=3)	--	2.0% (n=3)	5.4% (n=5)	1.7% (n=1)	3.9% (n=6)
50-59%	--	--	--	--	--	--	--	--	--	--	--	--
$\bar{X}$ Expressed in percentages	82.3%	84.8%	83.3%	83.3%	85.6%	84.1%	78.8%	82.5%	81.3%	79.6%	80.8%	80.1%

high gifted boys in both LA/SS and MA/SC at the grade three and six level. In terms of within-group achievements, girls performed equally well in LA/SS and MA/SC at the grade three level although their MA/SC scores were somewhat lower than their LA/SS scores at the grade six level; however, the differential between their mean LA/SS and MA/SC achievements in grade six was not large.

Boys showed a consistently better performance in MA/SC relative to their own performance in LA/SS at both grade levels but at no time were their MA/SC achievements higher than those of the girls.

Perhaps the most unexpected observation worth noting was the distribution of males and females within the respective grade categories. In both MA/SC and LA/SS and at both grade levels, there were consistently more males than females scoring below eighty percent. In grade three LA/SS almost three times as many boys as girls scored below eighty percent whereas in grade six LA/SS, this ratio had increased to approximately seven times as many more boys as girls scoring below eighty percent. The proportions were somewhat smaller in MA/SC; however, there were consistently more males than females scoring below eighty percent in the elementary grades. In view of the fact that males were disproportionately represented in gifted programming, this finding raises an important question regarding the equity of identification procedures and becomes more problematic when the later findings for this group of gifted males and females are considered.

Comparison of the elementary school achievements of the junior high cohort with those found for the elementary cohort showed several differences. For the elementary cohort, sex-typed effects were

observed for both males and females at the grade three and six level whereas sex-typed effects were found only for junior high males with respect to their own achievements in MA/SC and LA/SS. Furthermore, junior high females outperformed the junior high males consistently across both grade levels and in both subject areas whereas the elementary females performed better than males only in LA/SS. Another difference between these two cohorts was that the elementary boys performed almost as well as the girls in LA/SS at the grade six level whereas the junior high boys maintained their generally lower LA/SS performance relative to the junior high girls' grade six LA/SS performance.

2. Junior High School Performance

Examination of Table 5.9 demonstrates the superior performance of the junior high school girls compared to the boys in each of the junior high school grades. Girls consistently outperformed the boys in LA/SS and MA/SC. There was no notable difference in their LA/SS achievement relative to their MA/SC achievement with the exception of their grade nine scores. However, there were only ten girls at the grade nine level; consequently, it cannot be said that their performance was lower in MA/SC than it was in LA/SS at the grade nine level. In general then, their junior high school achievements did not show sex-typed effects, a continuation of the achievement patterns found at the elementary level.

Boys, on the other hand, showed a decidedly better performance in MA/SC than in LA/SS in each of the junior high school years, a finding which was also true in their elementary school achievements. Their overall performance was generally lower than the girls' performance at all grade levels and in both LA/SS and MA/SC.

Table 5.9

DISTRIBUTION OF JUNIOR HIGH GRADE SCORES FOR JUNIOR HIGH COHORT BY GRADE AND BY SEX

Grade Scores	Grade 7 Language Arts/Social St.			Grade 7 Math/Science			Grade 8 Language Arts/Social St.			Grade 8 Math/Science			Grade 9 Language Arts/Social St.			Grade 9 Math/Science		
	Male (n=91)	Female (n=58)	Total (n=149)	Male (n=91)	Female (n=58)	Total (n=149)	Male (n=34)	Female (n=22)	Total (n=56)	Male (n=34)	Female (n=22)	Total (n=56)	Male (n=15)	Female (n=10)	Total (n=25)	Male (n=15)	Female (n=10)	Total (n=25)
90-100%	5.5% (n=5)	19.0% (n=11)	10.7% (n=16)	19.8% (n=18)	25.9% (n=15)	22.1% (n=33)	2.9% (n=1)	22.7% (n=5)	10.7% (n=6)	8.8% (n=3)	27.3% (n=6)	16.1% (n=9)	--	30% (n=3)	12% (n=3)	13.3% (n=2)	30% (n=3)	20% (n=5)
80-89%	53.8% (n=49)	60.3% (n=35)	56.4% (n=84)	47.3% (n=43)	51.7% (n=30)	49.0% (n=73)	41.2% (n=14)	54.5% (n=12)	46.4% (n=26)	38.2% (n=13)	50.0% (n=11)	42.9% (n=24)	40% (n=6)	60% (n=6)	48% (n=12)	40% (n=6)	50% (n=5)	44% (n=11)
70-79%	29.7% (n=27)	20.7% (n=12)	26.2% (n=39)	29.7% (n=27)	20.7% (n=12)	26.2% (n=39)	32.4% (n=11)	22.7% (n=5)	28.6% (n=16)	41.2% (n=14)	13.6% (n=3)	30.4% (n=17)	46.7% (n=7)	10% (n=1)	32% (n=8)	33.3% (n=5)	10% (n=1)	24% (n=6)
60-69%	11% (n=10)	--	6.7% (n=10)	3.3% (n=3)	1.7% (n=1)	2.7% (n=4)	20.6% (n=7)	--	12.5% (n=7)	8.8% (n=3)	4.5% (n=1)	7.1% (n=4)	--	--	--	6.7% (n=1)	10% (n=1)	8% (n=2)
50-59%	--	--	--	--	--	--	2.9% (n=1)	--	1.8% (n=1)	2.9% (n=1)	4.5% (n=1)	3.6% (n=2)	13.3% (n=2)	--	8% (n=2)	6.7% (n=1)	--	4% (n=1)
$\bar{X}$	75.4%	79.2%	77.1%	78.4%	80.2%	79.1%	72.1%	80%	75.2%	74.2%	79.1%	76.1%	71.4%	82%	75.6%	74.7%	80%	76.8%

As shown in Table 5.10, the junior high school girls maintained their superior performance over the grade three to grade nine time period and whatever changes occurred in their respective achievements during this time were small and did not show a sex-typed pattern.

Since the number of students for whom scores were available varied at each of the junior high school levels, the twenty-five grade nine students (fifteen males, ten females) were selected for separate analysis in order to determine whether or not the general findings obtained for the total junior high cohort would hold true if the "n" were held constant. Analysis showed that the generalizations were warranted. By examining the individual achievements of these twenty-five students, the same general patterns of achievement were found to exist. The small group of females were superior in both LA/SS and MA/SC to the fifteen males throughout the school grades and their achievements were consistent across all subject areas. On the other hand, boys consistently performed better in MA/SC than they did in LA/SS but even their MA/SC achievements were lower than those of the girls - a consistent pattern of achievement over the years considered.

A closer examination of the achievement of this group of twenty-five students provided some interesting observations. Only one girl obtained scores below eighty percent in grades seven, eight and nine. She was one who had participated in the gifted program during her primary years of school but had dropped out of the program in grade five. She was also of lower working class origin and attended a school in which she was the only student who had been identified for programming.

The other nine girls maintained above eighty percent averages in

Table 5.10

MEAN GRADE SCORES FOR THE JUNIOR HIGH MALES AND FEMALES BY GRADE AND BY SEX

	FEMALES				MALES			
	LA/SS		MA/SC		LA/SS		MA/SC	
	$\bar{X}$	Difference	$\bar{X}$	Difference	$\bar{X}$	Difference	$\bar{X}$	Difference
Grade 3	84.8%		85.6%		82.3%		83.3%	
		-2.3%		-4.8%		-5.5%		-3.7%
Grade 6	82.5%		80.8%		76.8%		79.5%	
		-3.3%		- .6%		-1.4%		-1.2%
Grade 7	79.2%		80.2%		75.4%		78.4%	
		+ .8%		- .9%		-3.3%		-4.2%
Grade 8	80%		79.1%		72.1%		74.2%	
		+2.0%		+ .9%		- .7%		+ .5%
Grade 9	82%		80%		71.4%		74.7%	

both LA/SS and MA/SC. All of them became involved in gifted programming during grade five or six and interestingly enough, only three of these nine girls were of Class I or II SES backgrounds.

Only six of the fifteen males in this group maintained averages above eighty percent in LA/SS and MA/SC but even then, their respective achievements were generally lower than the girls in each of the junior high school grades. Grade nine MA/SC was the only exception and boys scored higher than the girls although the differential between their group means was only 1.1% - a differential which was not large enough to claim differential attainments.

All fifteen males, regardless of whether or not they scored above eighty percent, showed a better performance in MA/SC relative to their own performance in LA/SS. In addition, proportionately more males scored below eighty percent in LA/SS than in MA/SC, a finding which was true at the grade seven, eight and nine levels.

Contrary to the nine females achieving scores above eighty percent in both LA/SS and MA/SC, the six males who similarly did so were all of Class I and II SES origin. Six of the nine boys consistently scoring below eighty percent, on the other hand, were of lower class SES origin, a finding which seemed to indicate a tendency for lower class gifted boys to decline more in achievement relative to their middle class counterparts. It would seem then, that despite their being identified as "gifted", their high abilities were not enough to counter the powerful SES effects known to influence academic achievement. Perhaps the continuation of special educational programming specifically designed to maintain their intellectual interests might counteract some of these negative effects of SES upon their ultimate achievements.

In summary, the analysis of the elementary and junior high school achievements of the junior high cohort, therefore permits the following conclusions:

(1) Gifted girls outperformed the gifted boys in both LA/SS and MA/SC at the elementary and junior high school levels.

(2) Gifted girls performed equally well in both LA/SS and MA/SC, i.e. their achievements were not sex-typed.

(3) Gifted boys performed better in MA/SC than they did in LA/SS at both the elementary and junior high school level.

(4) There were proportionately more males than females scoring below eighty percent who, in turn, tended to be of lower SES origin.

C. Senior High School Cohort

The senior high school group of students consisted of 126 males and females, sixty-one (or 48.4%) males and sixty-five (or 51.6%) female. Sixty (or 47.6%) were in grade twelve, thirty-two (or 25.4%) were in grade eleven and thirty-four (or twenty-seven percent) in grade ten. With the exception of a very small percentage of the grade twelve students, almost all of these students participated in gifted programming during their grade seven, eight and/or nine school year.

Data loss was minimal for this group of students since elementary grade scores were available for approximately eighty-seven percent of the group and junior and senior high school grade scores for approximately ninety-eight percent of the group.

1. Elementary School Performance

Examination of Table 5.11 shows little difference between male and

Table 5.11

DISTRIBUTION OF ELEMENTARY GRADE SCORES FOR SENIOR HIGH COHORT BY GRADE AND BY SEX

Grade Achieved	Grade 3 Language Arts/Social St.			Grade 3 Math/Science			Grade 6 Language Arts/Social St.			Grade 6 Math/Science		
	Male (n=52)	Female (n=51)	Total (n=103)	Male (n=52)	Female (n=51)	Total (n=103)	Male (n=52)	Female (n=58)	Total (n=110)	Male (n=52)	Female (n=58)	Total (n=110)
90-100%	48.1% (n=25)	58.8% (n=30)	53.4% (n=55)	51.9% (n=27)	60.8% (n=31)	56.3% (n=58)	32.7% (n=17)	32.8% (n=19)	32.7% (n=36)	34.6% (n=18)	29.3% (n=17)	31.8% (n=35)
80-89%	28.8% (n=15)	21.6% (n=11)	25.2% (n=26)	26.9% (n=14)	19.6% (n=10)	23.3% (n=24)	46.2% (n=24)	53.4% (n=31)	50.0% (n=55)	50% (n=26)	46.6% (n=27)	48.2% (n=53)
70-79%	23.1% (n=12)	19.6% (n=10)	21.4% (n=22)	21.2% (n=11)	19.6% (n=10)	20.4% (n=21)	19.2% (n=10)	13.8% (n=8)	16.4% (n=18)	15.4% (n=8)	24.1% (n=14)	20% (n=22)
60-69%	--	--	--	--	--	--	1.9% (n=1)	--	.9% (n=1)	--	--	--
50-59%	--	--	--	--	--	--	--	--	--	--	--	--
$\bar{X}$ (expressed in percentages)	82.5%	83.9%	83.2%	83.1%	84.1%	83.6%	81%	81.9%	81.5%	81.9%	80.5%	81.2%

female achievements during the elementary grades. Though females had slightly higher group means than males in grade three LA/SS, grade three MA/SC and grade six LA/SS, none of the differentials were large. With respect to within-group performances, no sex-typed achievements were observed for the females at the grade three level with the girls performing equally well in both LA/SS and MA/SC. At the grade six level, their MA/SC performance was slightly lower than their LA/SS performance; however the 1.4% differential between their LA/SS and MA/SC group means was not large.

Males showed a consistently better performance in MA/SC relative to their own performance in LA/SS at both grade levels. With respect to between-group achievements, males performed lower than females in both LA/SS and MA/SC at the grade three level whereas the grade six level, their LA/SS achievement was similar to that of the girls but their MA/SC was slightly higher.

The major difference between male and female elementary achievements of this group of senior high school students lay in the distribution of scores. More boys than girls at the grade three and grade six level consistently scored below eighty percent in LA/SS whereas in grade six, more girls than boys scored below eighty percent in MA/SC.

Comparison of the elementary school achievements of the junior and senior high school cohorts showed basically the same patterns of achievement although there were several significant differences. The similarities between these two groups can be summarized as follows:

(1) Both junior and senior high school females tended to be generally superior performers to males in grade three, performing equally well in LA/SS and MA/SC, i.e. no sex-typed effects were evident.

(2) Both junior high and senior high school females showed slightly better LA/SS performance relative to their own performance in MA/SC at the grade six level; however, differentials were not large for either group.

(3) Both junior high and senior high males showed consistently better performance in MA/SC than in LA/SS at both grade levels.

(4) With the exception of the grade six MA/SC scores of senior high males, in both the junior and senior high cohorts there were proportionately more males than females scoring below eighty percent in LA/SS and MA/SC. In terms of within-group distributions, proportionately more males scored lower in LA/SS than in MA/SC and proportionately more girls scored lower in MA/SC than in LA/SS.

These two groups differed in several important respects, these being:

(1) Junior high school girls were consistently superior to the junior high school boys in both subject areas and both grade levels. The senior high males and females were relatively similar at both grade levels although girls had an advantage in grade three LA/SS and MA/SC. In grade six, girls maintained their slight edge in LA/SS but boys performed better than girls in MA/SC.

(2) Senior high school males showed relatively similar performance to the senior high school females in grade six LA/SS. Junior high school males, on the other hand, were considerably lower than junior high school females in grade six LA/SS.

2. Junior High School Performance

As indicated in Table 5.12, females currently in senior high school continued to outperform boys in LA/SS and MA/SC during their junior high school grades and only in grade nine MA/SC did the boys perform better than they did.

Table 5.12

DISTRIBUTION OF JUNIOR HIGH GRADE SCORES FOR SENIOR HIGH COHORT BY GRADE AND BY SEX

Grade Achieved	Grade 7 Language Arts/Social St.			Grade 7 Math/Science			Grade 8 Language Arts/Social St.			Grade 8 Math/Science			Grade 9 Language Arts/Social St.			Grade 9 Math/Science		
	Male (n=57)	Female (n=58)	Total (n=115)	Male (n=57)	Female (n=58)	Total (n=115)	Male (n=56)	Female (n=59)	Total (n=115)	Male (n=56)	Female (n=59)	Total (n=115)	Male (n=59)	Female (n=61)	Total (n=120)	Male (n=59)	Female (n=61)	Total (n=120)
90-100%	14.0% (n=8)	20.7% (n=12)	17.4% (n=20)	17.5% (n=10)	29.3% (n=17)	23.5% (n=27)	8.9% (n=5)	23.7% (n=14)	16.5% (n=19)	26.8% (n=15)	30.5% (n=18)	28.7% (n=33)	18.6% (n=11)	29.5% (n=18)	24.2% (n=29)	33.9% (n=20)	31.1% (n=19)	32.5% (n=39)
80-89%	52.6% (n=30)	63.8% (n=37)	58.3% (n=67)	61.4% (n=35)	51.7% (n=30)	56.5% (n=65)	60.7% (n=34)	57.6% (n=34)	59.1% (n=68)	57.1% (n=32)	54.2% (n=32)	55.7% (n=64)	52.5% (n=31)	55.7% (n=34)	54.2% (n=65)	49.2% (n=29)	50.8% (n=31)	50.0% (n=60)
70-79%	28.1% (n=16)	15.5% (n=9)	21.7% (n=25)	19.3% (n=11)	12.1% (n=7)	15.7% (n=18)	28.6% (n=16)	18.6% (n=11)	23.5% (n=27)	12.5% (n=7)	11.9% (n=7)	12.2% (n=14)	23.7% (n=14)	11.5% (n=7)	17.5% (n=21)	13.6% (n=8)	14.8% (n=9)	14.2% (n=17)
60-69%	1.8% (n=1)	--	.9% (n=1)	1.8% (n=1)	6.9% (n=4)	4.3% (n=5)	1.8% (n=1)	-- (n=0)	.9% (n=1)	3.6% (n=2)	1.7% (n=1)	2.6% (n=3)	1.7% (n=1)	3.3% (n=2)	2.5% (n=3)	3.4% (n=2)	3.3% (n=2)	3.3% (n=4)
50-59%	3.6% (n=2)	--	1.8% (n=2)	--	--	--	--	--	--	--	1.7% (n=1)	.9% (n=1)	3.4% (n=2)	--	1.7% (n=2)	--	--	--
$\bar{X}$ (expressed in percentages & rounded off to nearest tenth)	77%	80.5%	78.8%	79.5%	80.4%	79.9%	77.5%	80.5%	79%	80.7%	81%	80.9%	78.1%	81.1%	79.7%	81.4%	81%	81.2%

However, examination of the table shows that none of the differentials between male and female performance in either LA/SS and MA/SC were large although the differentials between male and female means in LA/SS were larger than those in MA/SC.

There were no readily apparent sex differences in female achievements and they performed equally well in both LA/SS and MA/SC in grades seven, eight and nine.

The senior high school males consistently performed better in MA/SC than they did in LA/SS in the junior high school grades. Interestingly, their achievements in both subject areas throughout junior high school remained fairly consistent and in fact, showed a slight increase in grade nine compared to their grade seven and eight scores. The boys also showed a general tendency to be more widely dispersed than the girls in the grade score categories in both LA/SS and MA/SC although the greatest dispersion of their scores was more evident in LA/SS than in MA/SC, a finding consistent with their elementary grade score distributions.

Table 5.13 shows the comparative junior high school performances of the junior and senior high school males. Examination of the scores shows that senior high school males showed a general tendency to increase in their achievements throughout junior high school whereas the junior high school males showed the reverse tendency. For neither group, however, were the changes in their achievements over the three years necessarily sex-typed, i.e. the changes did not appear to be greater in LA/SS compared to MA/SC. The changes over the years were more general than subject-specific for both groups.

Since the junior high school males had been involved in gifted

Table 5.13

GROUP MEANS FOR JUNIOR AND SENIOR HIGH MALE COHORTS
IN THE JUNIOR HIGH SCHOOL GRADES

	JUNIOR HIGH MALES				SENIOR HIGH MALES			
	LA/SS		MA/SC		LA/SS		MA/SC	
	$\bar{X}$	Difference	$\bar{X}$	Difference	$\bar{X}$	Difference	$\bar{X}$	Difference
Grade 7	75.4%		78.4%		77%		79.5%	
		-3.3%		-4.2%		+.5%		+1.2%
Grade 8	72.1%		74.2%		77.5%		80.7%	
		- .7%		+ .5%		+.6%		- .7%
Grade 9	71.4%		74.4%		78.1%		81.4%	

programs during their elementary school years, their grade seven to nine scores were obtained after their involvement in gifted programs. The senior high school group of males, on the other hand, obtained their grade seven to nine scores during their involvement in gifted programs. To what extent, then, was their high achievement and general constancy in performance a function of their participation in gifted programming? To what extent was the junior high school group of males generally lower performance in junior high school due to the withdrawal of gifted programming at that level? It would seem that part of the answer may lie in the high school achievements of the students who are currently in senior high school as well as in the later achievements of the gifted students who are currently in the elementary gifted program. However, it does appear from Table 5.13 that gifted programming may be an important factor in maintaining achievement. One may ask, therefore, whether programs for the gifted are like Head Start programs - useful, only if continued? Further research is therefore required.

Furthermore, the considerably lower performance of the junior high school gifted males compared to that of the junior high school gifted females, especially in light of their largely disproportionate ratios (111 male, seventy-three female), appears to suggest that males may be more readily identified for gifted programming than females. It also appears to be the case that higher achievement expectations and demands may be placed upon females relative to males in the selection procedures by teachers. In short, it may be easier to be identified as "gifted" if one is male than if one is female.

The questionability of selection procedures is further heightened

by the analysis of the comparative achievements of junior and senior high school males and females. Examination of Tables 5.14 and 5.15 shows that both groups of females were consistently superior to males in both LA/SS and MA/SC although it must be noted that differentials between senior high school males and females were very small in both subject areas and at all grade levels. The girls performed equally well in both LA/SS and MA/SC and their achievements did not appear to be sex-typed. A partial explanation for their superior performance relative to that of males may be traced to the selection procedures wherein only the most exceptionally able females were selected, a fact reflected in enrollment ratios, regular class achievements and will be seen later in standardized test and ability test results.

Table 5.15 also shows that both the junior and senior high school males performed consistently better in MA/SC relative to their own achievements in LA/SS; however, the high school group of males performed as well as the junior and senior high school females in MA/SC although they showed a definite weakness in LA/SS relative to their own achievements in MA/SC and relative to the girls' LA/SS achievements.

3. Senior High School Performance

Analysis of Table 5.16 shows sex-typed patterns of achievement for both the senior high school males and females in that males consistently performed better than females in MA/SC and females consistently performed better than males in LA/SS. However, the differentials between their respective achievements in LA/SS were small and one can conclude that there were no sex differences in the LA/SS achievements of gifted males and females currently at the high school level. MA/SC achievements, on the other hand, showed somewhat

Table 5.14

GROUP MEANS FOR JUNIOR HIGH AND SENIOR HIGH
FEMALE COHORTS IN THE JUNIOR HIGH SCHOOL GRADES

	JUNIOR HIGH FEMALES				SENIOR HIGH FEMALES			
	LA/SS		MA/SC		LA/SS		MA/SC	
	$\bar{X}$	Difference	$\bar{X}$	Difference	$\bar{X}$	Difference	$\bar{X}$	Difference
Grade 7	79.2%	+.8%	80.2%	-1.1%	80.5%	0%	80.4%	+.6%
Grade 8	80%	+2%	79.1%	+ .9%	80.5%	+.6%	81%	0%
Grade 9	82%		80%		81.1%		81%	

Table 5.15

COMPARISON OF JUNIOR HIGH SCHOOL PERFORMANCE BY JUNIOR AND SENIOR HIGH SCHOOL COHORTS BY GRADE AND BY SEX

	JUNIOR HIGH COHORT				SENIOR HIGH COHORT			
	Males		Females		Males		Females	
	LA/SS	MA/SC	LA/SS	MA/SC	LA/SS	MA/SC	LA/SS	MA/SC
Grade 7								
Above 80%	59.3%	67.1%	79.3%	77.6%	66.6%	78.9%	84.5%	81%
Below 80%	40.7%	32.9%	20.7%	22.4%	33.4%	21.1%	15.5%	19%
Grade 8								
Above 80%	44.1%	47%	77.2%	77.3%	69.6%	83.9%	81.3%	84.7%
Below 80%	55.9%	53%	22.8%	22.7%	30.4%	16.1%	18.7%	15.3%
Grade 9								
Above 80%	40%	53.3%	90%	80%	71.1%	83.1%	85.2%	81.9%
Below 80%	60%	42.7%	10%	20%	28.9%	16.9%	14.8%	18.1%

Table 5.16

DISTRIBUTION OF SENIOR HIGH GRADE SCORES FOR SENIOR HIGH COHORT BY GRADE AND BY SEX

Grade Achieved	Grade 10 Language Arts/Social St.			Grade 10 Math/Science			Grade 11 Language Arts/Social St.			Grade 11 Math/Science			Grade 12 Language Arts/Social St.			Grade 12 Math/Science		
	Male (n=61)	Female (n=65)	Total (n=126)	Male (n=61)	Female (n=65)	Total (n=126)	Male (n=45)	Female (n=46)	Total (n=91)	Male (n=45)	Female (n=46)	Total (n=91)	Male (n=29)	Female (n=29)	Total (n=58)	Male (n=29)	Female (n=29)	Total (n=58)
90-100%	18.0% (n=11)	7.7% (n=5)	12.7% (n=16)	32.8% (n=20)	24.6% (n=16)	28.6% (n=36)	11.1% (n=5)	15.6% (n=7)	13.2% (n=12)	24.4% (n=11)	17.4% (n=8)	20.9% (n=19)	13.8% (n=4)	20.7% (n=6)	17.2% (n=10)	17.2% (n=5)	17.2% (n=5)	17.2% (n=10)
80-89%	45.9% (n=28)	60.0% (n=39)	53.2% (n=67)	45.9% (n=28)	44.6% (n=29)	45.2% (n=57)	48.9% (n=22)	42.2% (n=19)	45.6% (n=41)	46.7% (n=21)	41.3% (n=19)	44.0% (n=40)	41.4% (n=12)	55.2% (n=16)	48.3% (n=28)	44.8% (n=13)	31.0% (n=9)	37.9% (n=22)
70-79%	21.3% (n=13)	24.6% (n=16)	23% (n=29)	9.8% (n=6)	20% (n=13)	15.1% (n=19)	33.3% (n=15)	37.8% (n=17)	35.6% (n=32)	15.6% (n=7)	32.6% (n=15)	24.2% (n=22)	27.6% (n=8)	17.2% (n=5)	22.4% (n=13)	24.1% (n=7)	27.6% (n=8)	25.9% (n=15)
60-69%	8.2% (n=5)	4.6% (n=3)	6.3% (n=8)	8.2% (n=5)	9.2% (n=6)	8.7% (n=11)	6.7% (n=3)	4.4% (n=2)	5.6% (n=5)	11.1% (n=5)	8.7% (n=4)	9.9% (n=9)	6.9% (n=2)	3.4% (n=1)	5.2% (n=3)	10.3% (n=3)	13.8% (n=4)	12.1% (n=7)
50-59%	6.6% (n=4)	3.1% (n=2)	4.8% (n=6)	1.6% (n=1)	1.5% (n=1)	1.6% (n=2)	--	--	--	2.2% (n=1)	--	1.1% (n=1)	6.9% (n=2)	--	3.4% (n=2)	3.4% (n=1)	10.3% (n=3)	6.9% (n=4)
Fail	--	--	--	1.6% (n=1)	--	.8% (n=1)	--	--	--	--	--	--	3.4% (n=1)	3.4% (n=1)	3.4% (n=2)	--	--	--
$\bar{X}$	76.1%	76.5%	76.3%	79.5%	78.2%	78.8%	76.4%	76.9%	76.7%	78%	76.8%	77.4%	73.8%	78.3%	76%	76.2%	73.1%	74.7%

greater differentials between male and female achievements although just as with the LA/SS differentials, none were large enough to claim any meaningful differences.

Tables 5.17 and 5.18 show that the tendency for males to perform better in MA/SC relative to their own performance in LA/SS was evident as early as grade three and became more pronounced during the junior and senior high years of schooling. In the same tables, one can see that proportionately more females were scoring below eighty percent in high school than they were in elementary and junior high school. Thus, their performances began to be noticeably lower at the high school level. However, it is important to note that their generally lower performance was not subject-specific, i.e. they did not appear to show a lower performance in MA/SC than they did in LA/SS.

In summary, the analysis of the regular grade scores for the senior high cohort yielded the following results:

(1) The gifted girls consistently outperformed the gifted boys in both LA/SS and MA/SC at the elementary and junior high levels. At the senior high level, both groups tended to perform equally well in LA/SS but boys tended to perform slightly better than the girls in MA/SC. It should be noted, however, that differentials between male and female group means were small and never exceeded a five percent differential.

(2) Proportionately more males than females scored below eighty percent in both LA/SS and MA/SC at the elementary and junior high levels. This was true only for LA/SS achievements at the high school level.

(3) Gifted boys consistently performed better in MA/SC than in LA/SS, a

Table 5.17

COMPARISON OF SENIOR HIGH SCHOOL MALES AND FEMALES IN HIGHEST QUINTILE BY GRADE AND BY SUBJECT

GRADE	FEMALE				MALE			
	LA/SS		MA/SC		LA/SS		MA/SC	
	Above 80%	Difference	Above 80%	Difference	Above 80%	Difference	Above 80%	Difference
Grade 3	80.4%		80.4%		76.9%		78.8%	
		+5.8%		-4.6%		+2.0%		+5.8%
Grade 6	86.2%		75.9%		78.9%		84.6%	
		-1.7%		+5.1%		-10.3%		-5.7%
Grade 7	84.5%		81.0%		68.6%		78.9%	
		-3.2%		+3.7%		+1.0%		+5.0%
Grade 8	81.3%		84.7%		69.6%		83.9%	
		+3.9%		-2.8%		+1.5%		- .8%
Grade 9	85.2%		81.9%		71.1%		83.1%	
		-17.5%		-12.7%		-7.2%		-4.4%
Grade 10	67.7%		69.2%		63.9%		78.7%	
		-9.9%		-10.5%		-3.9%		-7.6%
Grade 11	57.8%		58.7%		60.0%		71.1%	
		+12.1%		-10.5%		-4.8%		-8.9%
Grade 12*	75.9%		48.2%		55.2%		62.2%	

*Grade 12 results grossly exaggerated because of very small cell sizes.

Table 5.18

GROUP MEANS FOR SENIOR HIGH SCHOOL MALES AND FEMALES
BY GRADE AND BY SUBJECT

		Females		Males	
		LA/SS	MA/SC	LA/SS	MA/SC
Elementary	Grade 3	83.9%	84.1%	82.5%	83.1%
	Grade 6	81.9%	80.5%	81%	81.9%
Junior High	Grade 7	80.5%	80.4%	77%	79.5%
	Grade 8	80.5%	81%	77.5%	80.7%
	Grade 9	81.1%	81%	78.1%	81.4%
Senior High	Grade 10	76.5%	78.2%	76.1%	79.5%
	Grade 11	76.9%	76.8%	76.4%	78%
	Grade 12	78.3%	73.1%	73.8%	76.2%

tendency which was observed as early as grade three.

(4) Both gifted males and females tended to maintain their superior performance throughout their schooling although both showed generally lower performances each successive year. Females' performance tended to change more than males at the high school level but the changes in their achievement were similar in both subject areas and did not appear to follow a sex-typed pattern.

Standardized Test Results

A. Elementary Cohort

Standardized test results were available for over eighty percent of the group for grades four, five and six. Fewer scores were available at the grade three level because a large number of these students had not been in the E.P.S.B. system at the time. Given the relative completeness of the data file with respect to standardized test results, a more accurate and reliable profile could be obtained for this group of students than was possible for their regular school performances.

Analysis of Table 5.19 and 5.20 shows that there were no readily apparent sex differences in male and female achievements on standardized reading tests in the elementary grades. Both males and females performed equally well in each of the four elementary years for which standardized test results were available. Sex differences were apparent however in math achievements with boys consistently performing better than the girls. Boys similarly showed a better within-group performance in math than they did in reading whereas girls did not show a consistently better within-group performance in reading compared

Table 5.19

DISTRIBUTION OF GRADE 3 AND GRADE 4 STANDARDIZED TEST SCORES OF ELEMENTARY COHORT BY SEX

Grade Score	Grade 3 Standardized Reading			Grade 3 Standardized Math			Grade 4 Standardized Reading			Grade 4 Standardized Math		
	Male (n=31)	Female (n=27)	Total (n=58)	Male (n=28)	Female (n=24)	Total (n=52)	Male (n=58)	Female (n=45)	Total (n=103)	Male (n=57)	Female (n=42)	Total (n=99)
90-100%	41.9% (n=13)	51.9% (n=14)	46.6% (n=27)	64.3% (n=18)	54.2% (n=13)	59.6% (n=31)	55.2% (n=32)	42.2% (n=19)	49.5% (n=51)	61.4% (n=35)	59.5% (n=25)	60.6% (n=60)
80-89%	41.9% (n=13)	29.6% (n=8)	36.2% (n=21)	17.9% (n=5)	20.8% (n=5)	19.2% (n=10)	24.1% (n=14)	37.8% (n=17)	30.1% (n=31)	19.3% (n=11)	21.4% (n=9)	20.2% (n=20)
70-79%	12.9% (n=4)	14.8% (n=4)	13.8% (n=8)	14.3% (n=4)	8.3% (n=2)	11.5% (n=6)	15.5% (n=9)	13.3% (n=6)	14.6% (n=15)	12.3% (n=7)	11.9% (n=5)	12.1% (n=12)
60-69%	3.2% (n=1)	3.7% (n=1)	3.4% (n=2)	3.6% (n=1)	4.2% (n=1)	3.8% (n=2)	5.2% (n=3)	4.4% (n=2)	4.9% (n=5)	5.3% (n=3)	4.8% (n=2)	5.1% (n=5)
50-59%	--	--	--	--	8.3% (n=2)	3.8% (n=2)	--	--	--	--	2.4% (n=1)	1% (n=1)
Fail	--	--	--	--	4.2% (n=1)	1.9% (n=1)	--	2.2% (n=1)	1% (n=1)	1.8% (n=1)	--	1% (n=1)
$\bar{X}$ Expressed in percentage	82.3%	83.0%	82.6%	84.3%	79.6%	82.1%	82.9%	81.1%	82.1%	83.2%	83.1%	83.1%

Table 5.20

DISTRIBUTION OF GRADE 5 AND GRADE 6 STANDARDIZED TEST SCORES OF ELEMENTARY COHORT BY SEX

Grade Score	Grade 5 Standardized Reading			Grade 5 Standardized Math			Grade 6 Standardized Reading			Grade 6 Standardized Math		
	Male (n=62)	Female (n=50)	Total (n=112)	Male (n=64)	Female (n=48)	Total (n=112)	Male (n=62)	Female (n=47)	Total (n=109)	Male (n=65)	Female (n=51)	Total (n=116)
90-100%	64.5% (n=40)	60.0% (n=30)	62.5% (n=70)	70.3% (n=45)	60.4% (n=29)	66.1% (n=74)	67.7% (n=42)	68.1% (n=32)	67.9% (n=74)	66.2% (n=43)	51.0% (n=26)	59.5% (n=69)
80-89%	21.0% (n=13)	24.0% (n=12)	22.3% (n=25)	17.2% (n=11)	22.9% (n=11)	19.6% (n=22)	19.4% (n=12)	17.0% (n=8)	18.3% (n=20)	18.5% (n=12)	27.5% (n=14)	22.4% (n=26)
70-79%	12.9% (n=8)	8.0% (n=4)	10.7% (n=12)	10.9% (n=7)	10.4% (n=5)	10.7% (n=12)	4.8% (n=3)	10.6% (n=5)	7.3% (n=8)	9.2% (n=6)	5.9% (n=3)	7.8% (n=9)
60-69%	--	4.0% (n=2)	1.8% (n=2)	--	4.2% (n=2)	1.8% (n=2)	4.8% (n=3)	4.3% (n=2)	4.6% (n=5)	3.1% (n=2)	5.9% (n=3)	4.3% (n=5)
50-59%	1.6% (n=1)	2.0% (n=1)	1.8% (n=2)	--	2.1% (n=1)	.9% (n=1)	1.6% (n=1)	--	.9% (n=1)	1.5% (n=1)	3.9% (n=2)	2.6% (n=3)
Fail	--	2.0% (n=1)	.9% (n=1)	1.6% (n-1)	--	.9% (n=1)	1.6% (n=1)	--	.9% (n=1)	1.5% (n=1)	5.9% (n=3)	3.4% (n=4)
$\bar{X}$ * Expressed in percentage	84.7%	83.0%	83.9%	85.4%	83.5%	84.6%	84.2%	84.9%	84.5%	84.0%	79.3%	82.2%

to their math.

These standardized test results for the elementary gifted group of males and females differed from their regular performance results in that their achievements in LA/SS and MA/SC tended to be sex-typed, i.e. girls performed better than boys in LA/SS and better in LA/SS relative to their own achievements in MA/SC, and boys performed better in MA/SC relative to their own achievements in LA/SS. However, since these latter findings were based on a very small number of students, it is possible that different findings would have been obtained if a larger number of elementary students would have had complete data files with respect to regular grade scores.

B. Junior High School Cohort

Standardized test scores were available for the majority of the junior high group of students with scores at the grade three and four level being available for approximately sixty percent of the group and scores at the grade five and six level being available for approximately ninety percent.

Examination of Tables 5.21 and 5.22 shows that there were no apparent sex differences in either the standardized math or standardized reading achievements for the group of gifted males and females currently in junior high school.

Interestingly, for this group of students, the standardized reading achievements of the males were consistently better than their own standardized math achievements in each of the four years. The girls, on the other hand, performed equally well in both reading and math standardized tests.

Table 5.21

DISTRIBUTION OF GRADE 3 AND GRADE 4 STANDARDIZED TEST SCORES OF JUNIOR HIGH COHORT BY SEX

Grade Score	Grade 3 Standardized Reading			Grade 3 Standardized Math			Grade 4 Standardized Reading			Grade 4 Standardized Math		
	Male (n=71)	Female (n=41)	Total (n=112)	Male (n=68)	Female (n=41)	Total (n=109)	Male (n=91)	Female (n=56)	Total (n=147)	Male (n=79)	Female (n=47)	Total (n=126)
90-100%	50.7% (n=36)	39.0% (n=16)	46.4% (n=52)	48.5% (n=33)	39.0% (n=16)	45.0% (n=49)	53.8% (n=49)	57.1% (n=32)	55.1% (n=81)	58.2% (n=46)	57.4% (n=27)	57.9% (n=73)
80-89%	29.6% (n=21)	48.8% (n=20)	36.6% (n=41)	32.4% (n=22)	34.1% (n=14)	33.0% (n=36)	24.2% (n=22)	30.4% (n=17)	26.5% (n=39)	17.7% (n=14)	25.5% (n=12)	20.6% (n=26)
70-79%	14.1% (n=10)	7.3% (n=3)	11.6% (n=13)	10.3% (n=7)	7.3% (n=3)	9.2% (n=10)	14.3% (n=13)	8.9% (n=5)	12.2% (n=18)	12.7% (n=10)	10.6% (n=5)	11.9% (n=15)
60-69%	2.8% (n=2)	4.9% (n=2)	3.6% (n=4)	5.9% (n=4)	4.9% (n=2)	5.5% (n=6)	6.6% (n=6)	1.8% (n=1)	4.8% (n=7)	2.5% (n=2)	4.3% (n=2)	3.2% (n=4)
50-59%	2.8% (n=2)	--	1.8% (n=2)	1.5% (n=1)	4.9% (n=2)	2.8% (n=3)	1.1% (n=1)	1.8% (n=1)	1.4% (n=2)	7.6% (n=6)	2.1% (n=1)	5.6% (n=7)
Fail	--	--	--	1.5% (n=1)	9.8% (n=4)	4.6% (n=5)	--	--	--	1.3% (n=1)	--	.8% (n=1)
$\bar{X}$	82.3%	82.2%	82.2%	81.6%	76.8%	79.9%	82.3%	83.9%	82.9%	81.3%	83.2%	82%

Table 5.22

DISTRIBUTION OF GRADE 5 AND 6 STANDARDIZED TEST SCORES FOR JUNIOR HIGH COHORT BY SEX

Grade Score	Grade 5 Standardized Reading			Grade 5 Standardized Math			Grade 6 Standardized Reading			Grade 6 Standardized Math		
	Male (n=95)	Female (n=68)	Total (n=163)	Male (n=91)	Female (n=64)	Total (n=155)	Male (n=96)	Female (n=65)	Total (n=161)	Male (n=94)	Female (n=66)	Total (n=160)
90-100%	66.3% (n=63)	66.2% (n=45)	66.3% (n=108)	67.0% (n=61)	60.9% (n=39)	64.5% (n=100)	68.8% (n=66)	61.5% (n=40)	65.8% (n=106)	52.1% (n=49)	53.0% (n=35)	52.5% (n=84)
80-89%	22.1% (n=21)	19.1% (n=13)	20.9% (n=34)	19.8% (n=18)	26.6% (n=17)	22.6% (n=35)	14.6% (n=14)	26.2% (n=17)	19.3% (n=31)	19.1% (n=18)	24.2% (n=16)	21.3% (n=34)
70-79%	8.4% (n=8)	10.3% (n=7)	9.2% (n=15)	7.7% (n=7)	4.7% (n=3)	6.5% (n=10)	9.4% (n=9)	9.2% (n=6)	9.3% (n-15)	12.8% (n=12)	9.1% (n=6)	11.3% (n=18)
60-69%	3.2% (n=3)	4.4% (n=3)	3.7% (n=6)	2.2% (n=2)	1.6% (n=1)	1.9% (n=3)	4.2% (n=4)	3.1% (n=2)	3.7% (n=6)	7.4% (n=7)	10.6% (n=7)	8.8% (n=14)
50-59%	--	--	--	1.1% (n=1)	3.1% (n=2)	1.9% (n=3)	2.1% (n=2)	--	1.2% (n=2)	6.4% (n=6)	3.0% (n=2)	5.0% (n=8)
Fail	--	--	--	2.2% (n=2)	3.1% (n=2)	2.6% (n=4)	1% (n=1)	--	.6% (n=1)	2.1% (n=2)	-- (n=0)	1.3% (n=2)
$\bar{X}$	85.2%	84.7%	85%	84.3%	83.2%	83.8%	84.1%	84.6%	84.3%	79.7%	81.4%	80.4%

A rather surprising finding was the large number of students obtaining standardized test scores below eighty percent and actually failing the respective tests. As shown in Table 5.21, in grade three standardized math, almost ten percent of the girls failed. The percentage of students scoring below eighty percent in both reading and math varied anywhere between twelve percent to twenty-eight percent although neither males nor females scored consistently lower than the other. Just as their relative performances were not sex-typed, neither was their distribution in the lowest grade score categories. However, the total percentage of students achieving in the fifty to sixty-nine percent grade score range was unexpected particularly since one of the identification criteria for gifted programming was superior standardized test performance which was to be upwards of eighty percent in both reading and math.

The standardized test results for the junior high cohort differed somewhat from those obtained for the elementary cohort. Sex differences were found in standardized math achievements for only the elementary cohort whereas none had been found in reading for either elementary or junior high school cohorts. These two cohorts also differed in the distribution of standardized test scores. The junior high males and females were more widely dispersed across the various grade score categories than were the elementary males and females although neither group showed a consistent sex-typed pattern in their standard deviations.

C. Senior High School Cohort

As indicated in Chapter IV of the thesis, no systematic administra-

tion of standardized tests was conducted during the time that the senior high school gifted males and females in elementary school. Similarily, standardized tests were not administered on a regular system-wide basis at the junior or senior high school levels. Thus, no standardized test scores were available for this group of students.

Ability Test Scores

A. Elementary Cohort

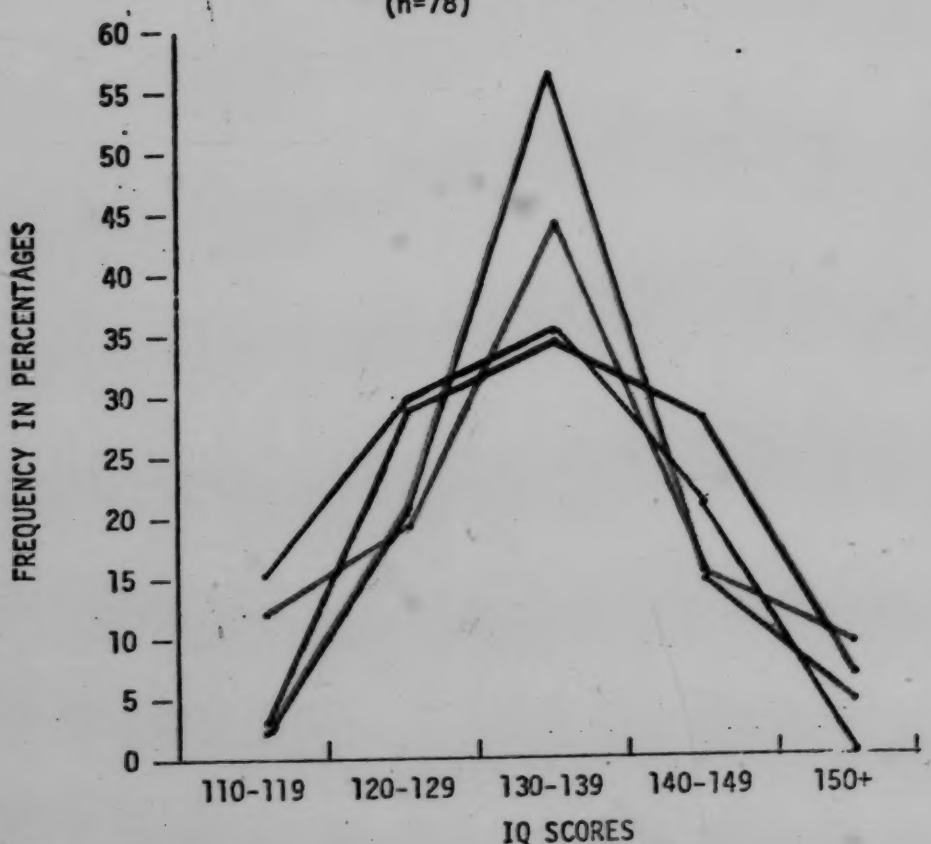
Canadian Lorge Thorndike Ability Test scores (CLT) were available for approximately two-thirds of the elementary group at the grade three level and for ninety-eight percent of the group at the grade six level. Many of the students for whom grade three scores were not available had not written the CLT either because they had not been in the E.P.S.B. system at the time the tests were written or else they had been absent the day of the testing.

An examination of the Lorge Thorndike Ability test scores of the gifted students currently in elementary school (See Figures 5.1, 5.2 and Table 5.23) shows slightly better performance of females on the non-verbal sub-test and similar mean scores for males and females on the verbal sub-test at the grade three level. Interestingly, while males performed better on the verbal portion than on the non-verbal portion, females performed equally well on both. At the grade six level verbal and non-verbal mean scores for both males and females were lower than at the grade three level but the difference was more notable in the case of females. As a consequence of these lower scores for females on both forms of the tests, male scores exceeded those of females - a reversal of the grade three case.

Figure 5.1

GRADE 3 LORGE THORNDIKE ABILITY TEST SCORES

FOR ELEMENTARY COHORT
(n=78)



KEY:

Verbal Sub-Test Scores
Male = ——
Female = ——

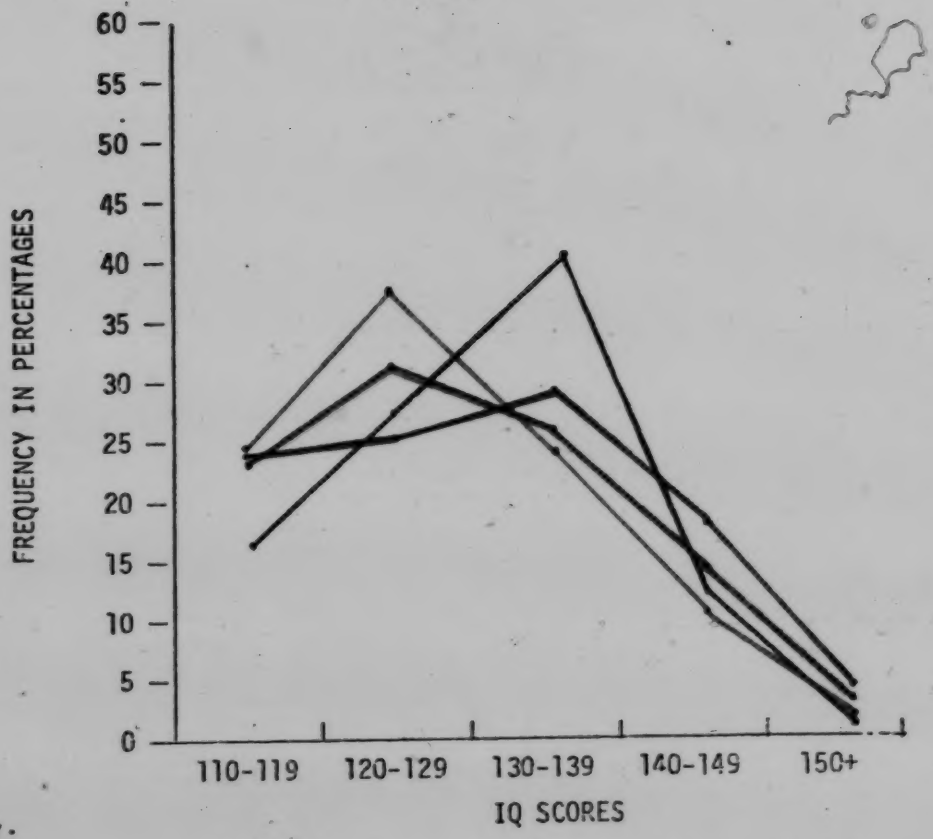
Non-Verbal Sub-Test Scores
Male = ——
Female = ——

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=78)	6.4%	15.4%	51.3%	20.5%	6.4%	10.2%	28.2%	34.6%	24.4%	2.6%
Male (n=46)	2.2%	21.7%	56.5%	15.2%	4.4%	15.2%	28.3%	34.8%	21.8%	0%
Female (n=32)	12.5%	18.8%	43.7%	15.6%	9.4%	3.1%	28.1%	34.3%	28.2%	6.3%

Figure 5.2

GRADE 6 LORGE THORNDIKE ABILITY TEST SCORES
FOR ELEMENTARY COHORT
(n=120)



KEY:

Verbal Sub-Test Scores
Male =
Female =

Non-Verbal Sub-Test Scores
Male =
Female =

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=120)	24.2%	34.2%	25.8%	13.3%	2.5%	19.5%	26.3%	36.4%	15.3%	2.5%
Male (n=67)	23.9%	31.3%	26.8%	15.0%	3.0%	16.4%	26.9%	41.8%	13.4%	1.5%
Female (n=53)	24.5%	37.8%	24.5%	11.3%	1.9%	23.5%	25.5%	29.4%	17.7%	3.9%

Table 5.23

TEST MEANS FOR CANADIAN LORGE THORNDIKE ABILITY TEST
FOR ELEMENTARY COHORT BY GRADE AND BY SEX

	MALE			FEMALE		
	$\bar{X}$	IQ Equivalent	Std. Deviation	$\bar{X}$	IQ Equivalent	Std. Deviation
Grade 3 Verbal Sub-Test	5.50	137.5	1.56	5.59	137.95	2.20
Grade 3 Non-Verbal Sub-Test	4.80	134	2.02	5.47	137.35	1.90
Grade 6 Verbal Sub-Test	4.36	131.8	2.12	3.94	129.7	1.93
Grade 6 Non-Verbal Sub-Test	4.70	133.5	2.0	4.49	132.45	2.18

Figures 5.1 and 5.2 also show that for a substantially large number of males and females, IQ test scores changed during the grade three to six interval. There were proportionately more males and females scoring below 130 in the grade six verbal sub-test compared to the proportions scoring below 130 in grade three; however, there were no apparent differentials in the proportions of males and females scoring below 130. Approximately thirty-one percent more males and females scored in the 110 - 129 IQ range in grade six compared to grade three. In the non-verbal sub-test, proportionately more females than males scored in the 110 - 129 IQ category in grade six compared to grade three whereas the proportion of boys remained fairly constant in the respective ability range categories. What was surprising was that almost half of the males and females were scoring below 130 in grade six in both verbal and non-verbal IQ tests. To what extent then was the IQ criterion of 130 being adhered and to what extent was the label "gifted" justifiable when almost half of the students labelled "gifted" in their early elementary years no longer maintained IQ test scores in the "gifted" range? However, since these ability test results were not full scale scores as generally reported for individual IQ tests (Stanford Binet, WISC), it is quite likely that a large number of the students may show a discrepancy intra-individually between their verbal and non-verbal IQ test scores such that one of their scores may well be in the 130 or "gifted" IQ range but the other in the 110 - 129 IQ range. Further statistical analysis is therefore demanded to determine whether or not the students scoring within the non-gifted IQ range are the same students in both the verbal and the non-verbal sub-tests.

B. Junior High School Cohort

CLT ability test scores were available for approximately eighty percent of the junior high sample at the grade three level and for over ninety percent at the grade six level. Since only thirty students in the junior high group were in grade nine, grade nine CLT scores were available only for these thirty students.

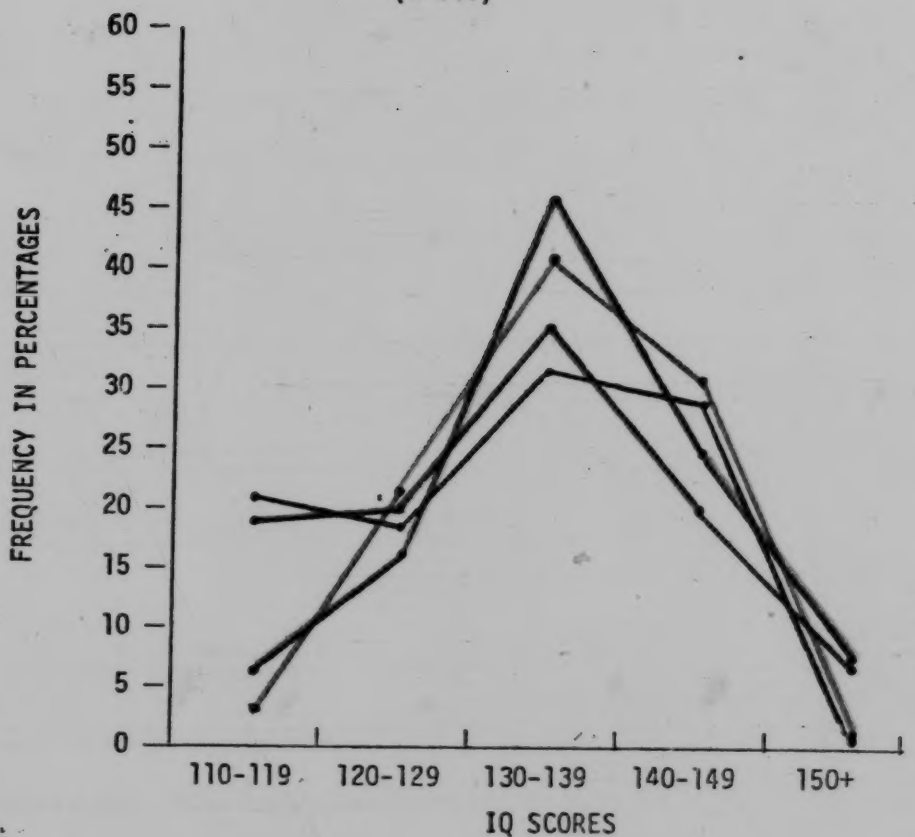
An examination of the Lorge Thorndike Ability test scores for the gifted males and females currently in junior high school (See Figures 5.3 and 5.4 and Table 5.24) shows similar performance by both males and females in the verbal and non-verbal sub-tests at the grade three level. At the grade six level, mean scores for males and females were similar in the verbal sub-tests but girls scored slightly higher than males in the non-verbal sub-test.

Non-verbal scores for both males and females in the grade six Lorge Thorndike were higher than their verbal sub-test scores, a reversal of the grade three ability test scores.

Figures 5.3 and 5.4 demonstrate that proportionately more students performed lower in grade six verbal and non-verbal sub-tests relative to their grade three distributions although there were few readily apparent differences between male and female distributions. A significant fifty-seven percent of the total gifted junior high cohort scored below 130 IQ in the verbal sub-test and forty percent in the non-verbal sub-test. This finding, as well as that regarding the IQ score distributions of elementary males and females, raises significant questions regarding identification procedures. Since approximately forty - sixty percent of both the elementary and junior high school cohorts were scoring in the 110 - 129 IQ range in their grade six verbal

Figure 5.3

GRADE 3 LORGE THORNDIKE ABILITY TEST SCORES
FOR JUNIOR HIGH COHORT
(n=144)



KEY:

Verbal Sub-Test Scores
Male = ▬▬
Female = ——

Non-Verbal Sub-Test Scores
Male = ——
Female = ▬▬

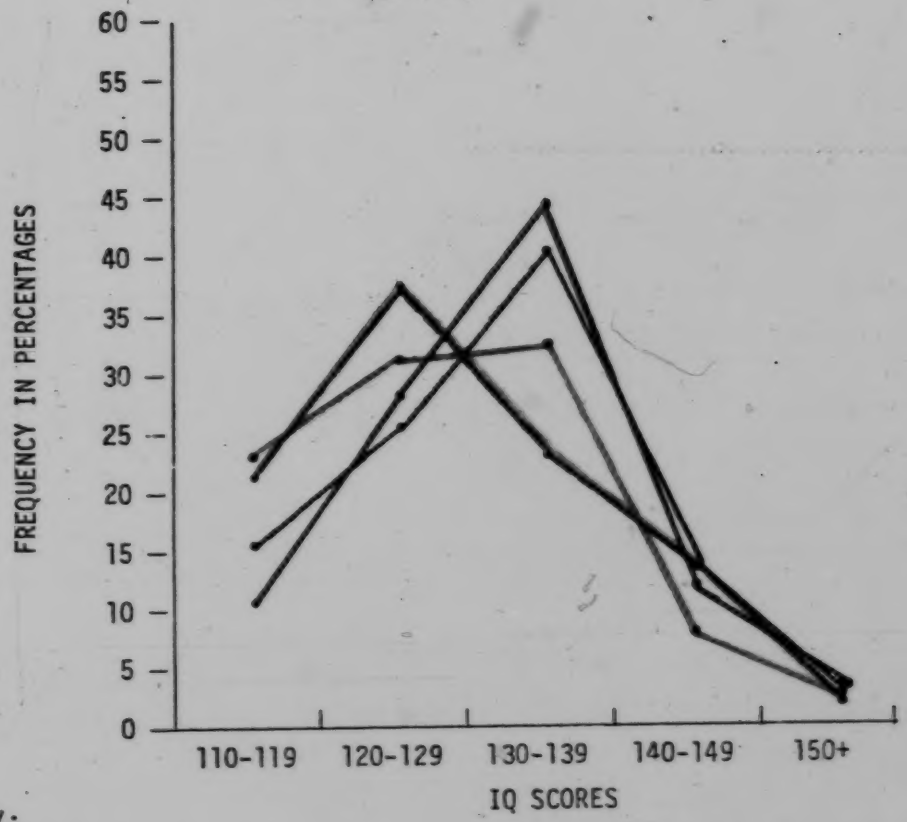
Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=144)	4.9%	18.7%	43.7%	27.8%	4.9%	19.6%	18.9%	32.9%	25.2%	3.5%
Male (n=84)	6.0%	16.7%	45.2%	25.0%	7.1%	20.5%	18%	31.4%	28.9%	1.2%
Female (n=80)	3.4%	21.7%	41.6%	31.6%	1.7%	18.3%	20%	35%	20%	6.7%

Figure 5.4

GRADE 6 LORGE THORNDIKE ABILITY TEST SCORES

FOR JUNIOR HIGH COHORT
(n=168)



KEY:

Verbal Sub-Test Scores
Male =
Female =

Non-Verbal Sub-Test Scores
Male =
Female =

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=168)	22.3%	35.3%	27.6%	12.4%	2.4%	13.6%	26.8%	42.2%	14.3%	3.0%
Male (n=101)	21.7%	37.7%	23.8%	14.8%	2.0%	15.8%	25.8%	40.6%	14.8%	3.0%
Female (n=67)	23.2%	31.9%	33.3%	8.7%	2.9%	10.5%	28.4%	44.8%	13.4%	3.0%

Table 5.24

TEST MEANS FOR CANADIAN LORGE THORNDIKE ABILITY TEST
FOR JUNIOR HIGH SCHOOL COHORT BY GRADE AND BY SEX

	MALE			FEMALE		
	$\bar{X}$	IQ Equivalent	Std. Deviation	$\bar{X}$	IQ Equivalent	Std. Deviation
Grade 3 Verbal Sub-Test	5.70	138.5	1.87	5.65	138.25	1.79
Grade 3 Non-Verbal Sub-Test	4.9	134.5	2.32	5.00	135.00	2.30
Grade 6 Verbal Sub-Test	4.28	131.4	2.05	4.26	131.3	2.08
Grade 6 Non-Verbal Sub-Test	4.77	133.85	2.02	4.85	134.25	1.79
Grade 9 Verbal Sub-Test	3.72	128.6	1.87	4.25	131.25	2.22
Grade 9 Non-Verbal Sub-Test	6.76	143.8	2.33	6.0	140	2.29

and non-verbal IQ sub-tests, the appropriateness of the label "gifted" once again arises. But, as also indicated earlier, further analysis is required in order to determine specifically which students were scoring below 130 in the verbal and non-verbal sub-tests and whether or not there were any commonalities between them in terms of SES, race and/or ethnicity, family structure and motivations. The small cell sizes within this sample prevent more extensive cross-tabulation and therefore, prevent a more accurate profile of those students whose IQ test scores changed over the grade three to six time interval. The possibility, however, that changes in IQ test scores are mere artifacts of the test instruments, changes in test directions, renorming and/or marking procedures must not be overlooked.

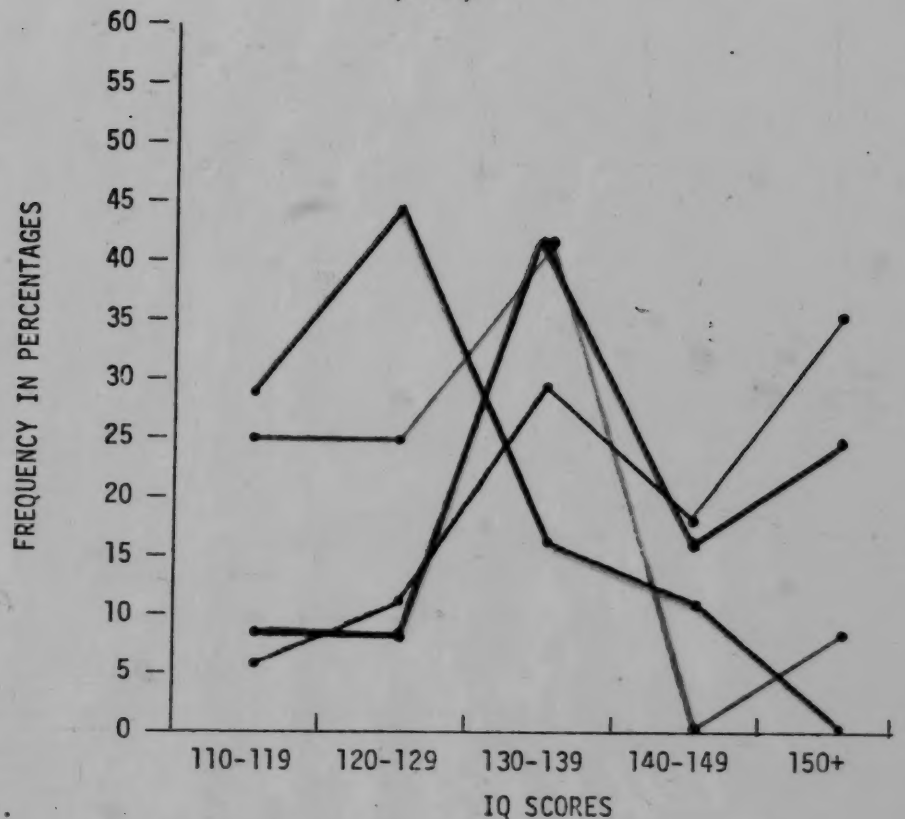
Further comparison of elementary and junior high school cohorts showed remarkably similar profiles at the grade three level in both the verbal and non-verbal sub-tests. Whereas the junior high school males and females tended to be similar to those boys currently in elementary school at both grade levels and in both verbal and non-verbal achievements, the girls currently in elementary school showed a generally lower performance than any of the other groups, particularly in the non-verbal achievements. It may be possible that the greater generosity in selecting females for gifted programs at the elementary level (as indicated in the male/female ratios in 1976/77 and 1977/78) resulted in the selection of girls who were less analytic/quantitative in cognitive style than those previously selected for gifted programming and who were perhaps more typically "feminine" in their modes of cognition, interests and respective achievements.

Figure 5.5 is provided to show the grade nine ability test scores

Figure 5.5

GRADE 9 LORGE THORNDIKE ABILITY TEST SCORES

FOR JUNIOR HIGH COHORT
(n=30)



KEY:

Verbal Sub-Test Scores
Male =
Female =

Non-Verbal Sub-Test Scores
Male =
Female =

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=30)	26.6%	36.6%	26.7%	6.7%	3.3%	6.9%	10.3%	34.5%	17.2%	31.0%
Male (n=18)	27.8%	44.4%	16.7%	11.1%	0%	5.9%	11.8%	29.4%	17.6%	35.3%
Female (n=12)	25.0%	25%	41.7%	0%	8.3%	8.3%	8.3%	41.7%	16.7%	25.0%

for the gifted males and females currently in junior high school; however, the small number for whom CLT scores were available prevent any generalizations being drawn. It is interesting to note that for this group of students, the females performed slightly better than the males on the verbal sub-test and the males performed slightly better than the females on the non-verbal sub-test, a reverse situation of their grade three and six tendencies.

C. Senior High School Cohort

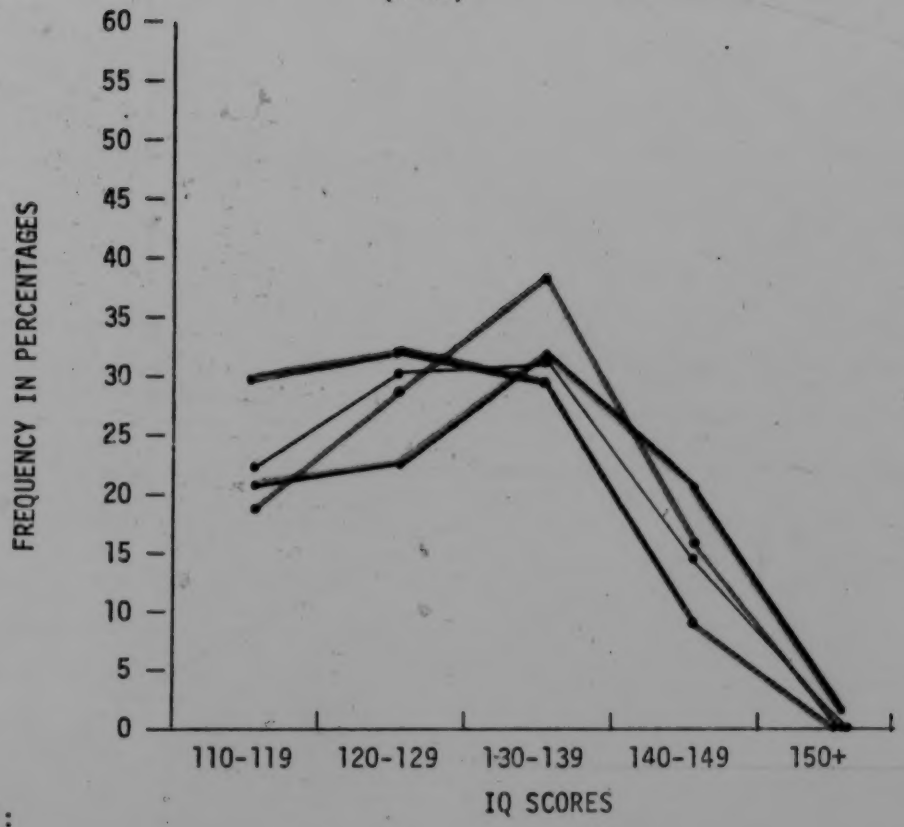
CLT test results for the grade three, six and nine levels were obtained for well over eighty percent of the gifted students currently in high school. Data loss was the greatest at the grade three level primarily because many of the students were not in the E.P.S.B. system during their primary grades.

Examination of the grade three and six Lorge Thorndike Ability test scores for the senior high gifted males and females shows relatively similar mean performances although at both grade levels, males performed slightly better than females on the verbal sub-tests. (See Figures 5.6 and 5.7.) At the grade six level, females performed better than males on the non-verbal sub-test, a reversal of their respective performances at the grade three level. Both males and females showed higher mean scores at the grade six level relative to their grade three mean scores but interestingly enough, males showed a larger increase in their verbal sub-test whereas the females showed a larger increase in their non-verbal scores.

As shown in Table 5.25 and Figure 5.8, in the grade nine verbal and non-verbal sub-tests, males scored higher than females in the

Figure 5.6

GRADE 3 LORGE THORNDIKE ABILITY TEST SCORES
FOR SENIOR HIGH COHORT
(n=86)



KEY:

Verbal Sub-Test Scores
Male =
Female =

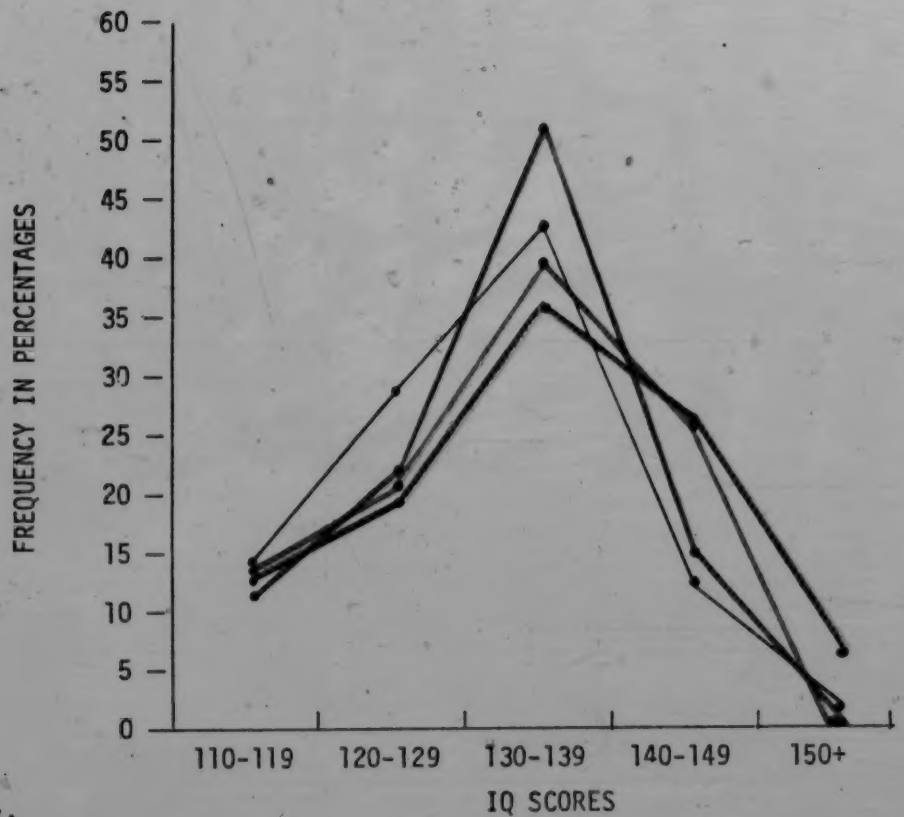
Non-Verbal Sub-Test Scores
Male =
Female =

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=86)	19.8%	25.6%	34.8%	18.6%	1.2%	25.6%	31.1%	31.1%	12.2%	0%
Male (n=43)	20.9%	23.3%	32.6%	20.9%	2.3%	22.5%	30.0%	32.5%	15.0%	0%
Female (n=43)	18.6%	27.9%	37.2%	16.3%	0%	29.4%	32.3%	29.4%	8.8%	0%

Figure 5.7

GRADE 6 LORGE THORNDIKE ABILITY TEST SCORES
FOR SENIOR HIGH COHORT
(n=109)



KEY:

Verbal Sub-Test Scores
Male =
Female =

Non-Verbal Sub-Test Scores
Male =
Female =

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=109)	12.8%	20.2%	37.6%	26.6%	2.8%	12.8%	25.7%	46.8%	13.8%	.9%
Male (n=56)	12.5%	19.6%	35.7%	26.8%	5.4%	14.3%	28.6%	42.8%	12.5%	1.8%
Female (n=53)	13.2%	20.7%	39.6%	26.5%	0%	11.4%	22.6%	50.9%	15.1%	0%

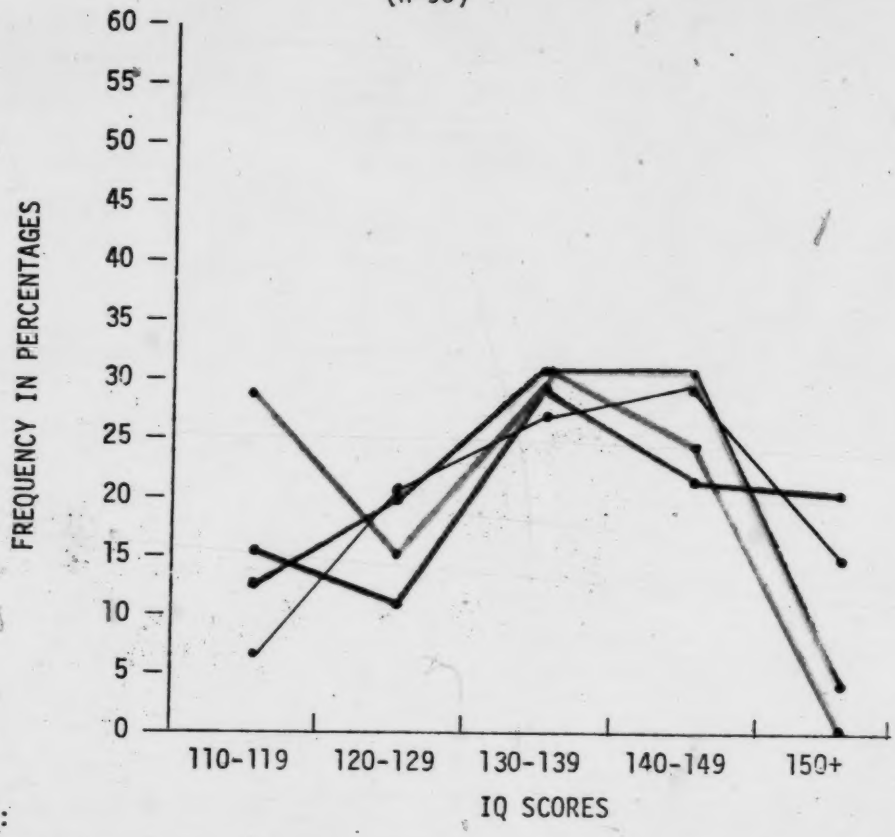
Table 5.25

TEST MEANS FOR CANADIAN LORGE THORNDIKE ABILITY TEST
FOR SENIOR HIGH SCHOOL COHORT BY GRADE AND BY SEX

	MALE			FEMALE		
	$\bar{X}$	IQ Equivalent	Std. Deviation	$\bar{X}$	IQ Equivalent	Std. Deviation
Grade 3 Verbal Sub-Test	4.67	133.5	2.35	4.60	133	1.89
Grade 3 Non-Verbal Sub-Test	4.35	131.8	2.01	3.85	129.3	1.91
Grade 6 Verbal Sub-Test	5.30	136.5	2.19	5.06	135.3	1.95
Grade 6 Non-Verbal Sub-Test	4.59	132.95	1.95	4.94	134.7	1.76
Grade 9 Verbal Sub-Test	5.44	137.2	2.22	4.44	132.2	2.28
Grade Non-Verbal Sub-Test	6.05	140.3	2.23	5.82	139.1	2.62

Figure 5.8

GRADE 9 LORGE THORNDIKE ABILITY TEST SCORES
FOR SENIOR HIGH COHORT
(n=90)



KEY:

Verbal Sub-Test Scores
Male =
Female =

Non-Verbal Sub-Test Scores
Male =
Female =

Frequency Distributions

	VERBAL					NON-VERBAL				
	110-119	129-129	130-139	140-149	150+	110-119	120-129	130-139	140-149	150+
Total Sample (n=90)	21.1%	17.7%	31.2%	27.8%	2.2%	11.4%	15.9%	28.4%	26.1%	18.2%
Male (n=45)	13.4%	20.0%	31.1%	31.1%	4.4%	6.8%	20.5%	27.3%	29.5%	15.9%
Female (n=45)	28.8%	15.5%	31.1%	24.4%	0%	15.9%	11.4%	29.5%	22.7%	20.5%

verbal sub-test and the non-verbal sub-test. The girls' grade nine verbal mean was considerably lower than their grade nine non-verbal mean as well as being lower than their grade three and six verbal means. The reverse situation was true for their grade nine non-verbal mean, i.e. it was at its highest point in grade nine compared to the previous years. Thus for girls, the inverse of what would normally have been expected, was observed at the higher grade levels.

In general, then, both senior high males and females showed higher verbal and non-verbal IQ scores each progressive year with males achieving their highest verbal and non-verbal IQ scores in grade nine and with females similarily obtaining their highest non-verbal mean in grade nine. Surprisingly, the girls' verbal IQ scores were at their lowest. These findings raise the question of whether or not the relative constancy and/or higher IQ test performance for both males and females was a function of high SES, high motivation and a constant, educationally stimulating environment as had been suggested in the literature review or whether it was a function of changes in test conditions over the six-year time interval. Figures 5.6, 5.7, and 5.8 show fairly similar distributions of males and females scoring within the various ability ranges although the males were slightly more dispersed than the females at the grade three and six level with the reverse being true at the grade nine level. Compared to the elementary and junior high school cohorts, proportionately fewer senior high males and females scored in the 110 - 129 IQ range. The percentage of senior high students in the "non-gifted" range varied from approximately twenty-eight - forty percent whereas the elementary and junior high cohorts varied from forty - sixty percent scoring in

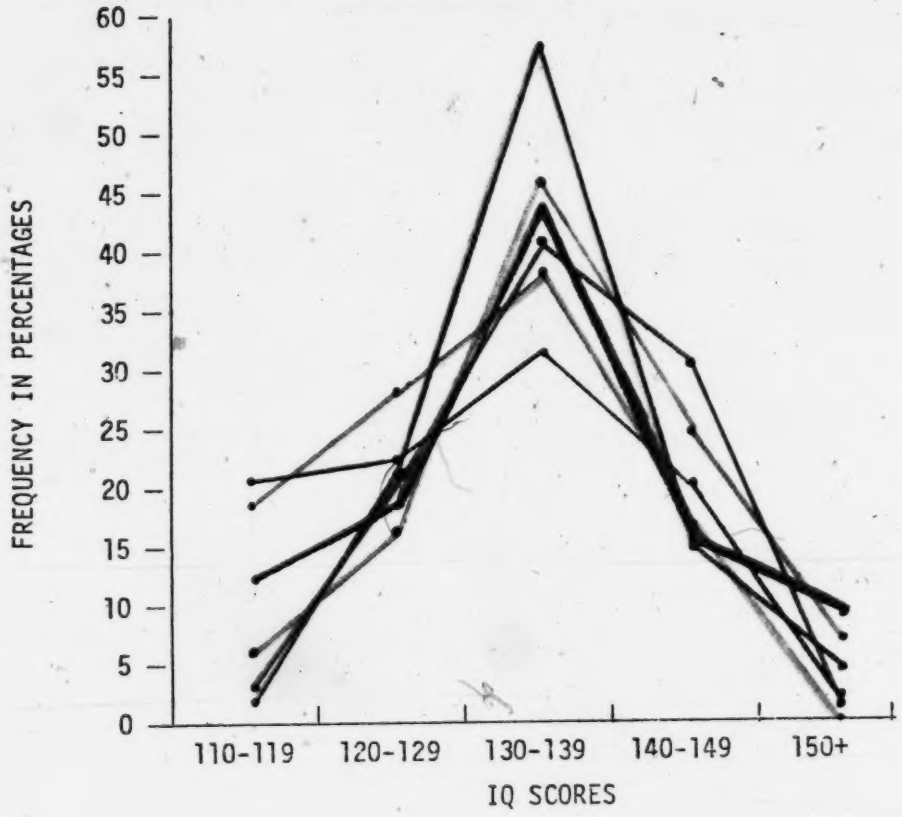
the "non-gifted" range. It would seem that perhaps the time during which students are chosen for gifted programming is an important factor in IQ test score constancy. By junior high, considerable "cooling-out" has already occured and the number of students from which to choose for gifted programming has been considerably narrowed to the high achievers, highly motivated and academically oriented individuals. At the elementary level, however, the field of possible candidates is considerably broader - and also more equitable since, as Table 5.6 showed, more lower class students were selected at the elementary level compared to the senior high level and, as Tables 5.2 and 5.3 showed, more females were selected as well.

D. Between-Group Comparisons

Though some inter-group comparison of ability profiles has already been made, this section will compare all three groups in order to see if there are some similarities between the groups which have implication for identification of gifted students. Examination of Figures 5.9 and 5.10 demonstrates the generally superior performance of all groups in the verbal ability sub-test relative to the non-verbal sub-test at the grade three level. Furthermore, elementary and junior high school gifted males and females scored better than the senior high school males and females in the grade three verbal and non-verbal sub-tests whereas the reverse was true in the grade six verbal and non-verbal sub-tests. (See Figures 5.11 and 5.12)

These particular findings raise several significant questions regarding identification. The elementary and junior high school cohorts of gifted males and females were mainly identified for gifted

Figure 5.9
FREQUENCY DISTRIBUTION OF GRADE 3 VERBAL LORGE THORNDIKE ABILITY TEST SCORES FOR ELEMENTARY, JUNIOR HIGH AND SENIOR HIGH COHORTS



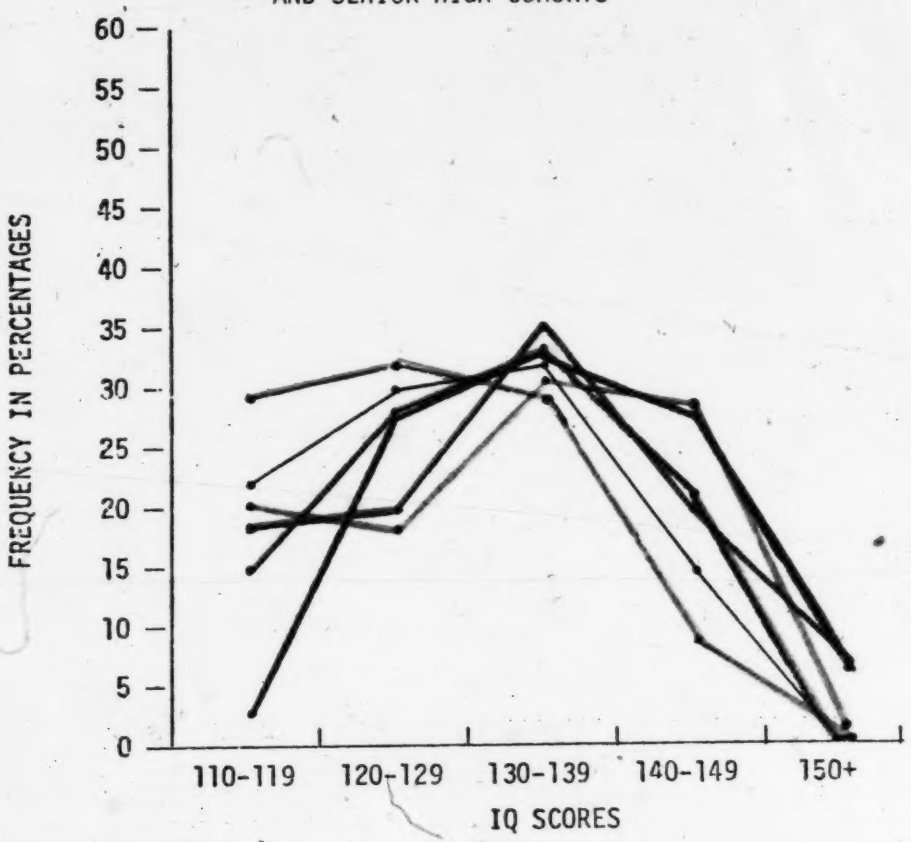
Frequency Distributions

	110-119	120-129	130-139	140-149	150+
ELEMENTARY(n=78)					
Male (n=46)	2.2%	21.7%	56.5%	15.2%	4.4%
Female (n=32)	12.5%	18.8%	43.7%	15.6%	9.4%
JUNIOR HIGH(n=164)					
Male (n=84)	6.0%	16.7%	45.2%	25.0%	7.1%
Female (n=80)	3.4%	21.7%	41.6%	31.6%	1.7%
SENIOR HIGH(n=86)					
Male (n=43)	20.9%	23.3%	32.6%	20.9%	2.3%
Female (n=43)	18.6%	27.9%	37.2%	16.3%	0%

Key to Graph

Figure 5.10

FREQUENCY DISTRIBUTION OF GRADE 3 NON-VERBAL LORGE THORNDIKE ABILITY TEST SCORES FOR ELEMENTARY, JUNIOR HIGH AND SENIOR HIGH COHORTS

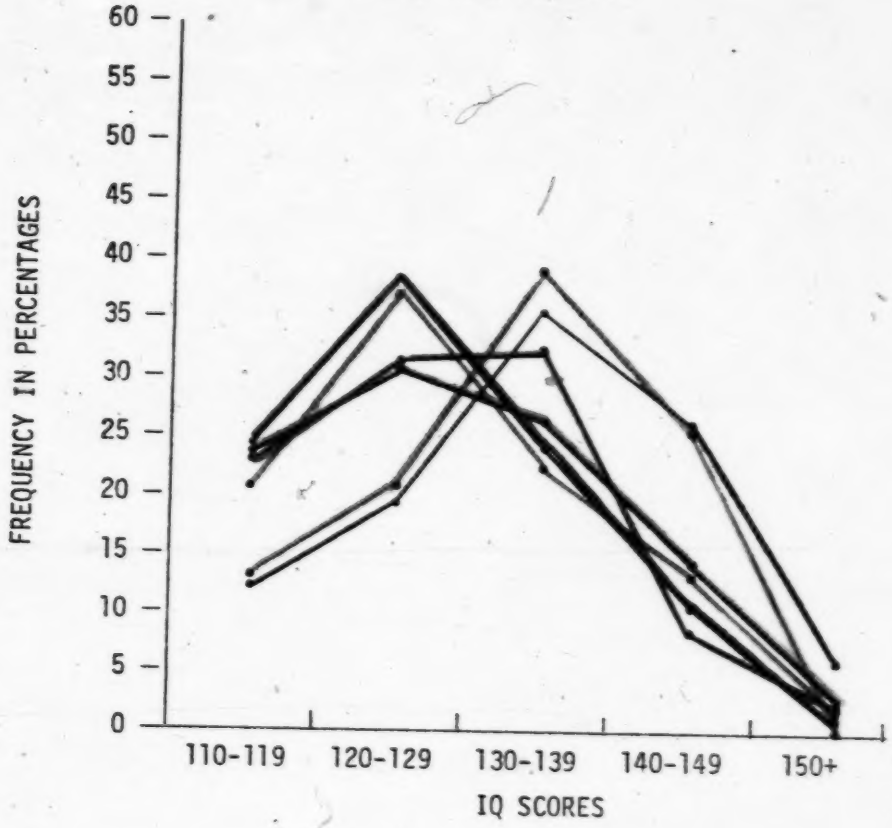


Frequency Distributions

	110-119	120-129	130-139	140-149	150+
ELEMENTARY(n=78)					
Male (n=46)	15.2%	28.3%	34.8%	21.8%	0%
Female (n=32)	3.1%	28.1%	34.3%	28.2%	6.3%
JUNIOR HIGH(n=164)					
Male (n=84)	20.5%	18%	31.4%	28.9%	1.2%
Female (n=80)	18.3%	20%	35%	20%	6.7%
SENIOR HIGH(n=86)					
Male (n=43)	22.5%	30%	32.5%	15%	0%
Female (n=43)	29.4%	32.3%	29.4%	8.8%	0%

Key to Graph

Figure 5.11
FREQUENCY DISTRIBUTION OF GRADE 6 VERBAL LORGE THORNDIKE ABILITY TEST SCORES FOR ELEMENTARY, JUNIOR HIGH AND SENIOR HIGH COHORTS



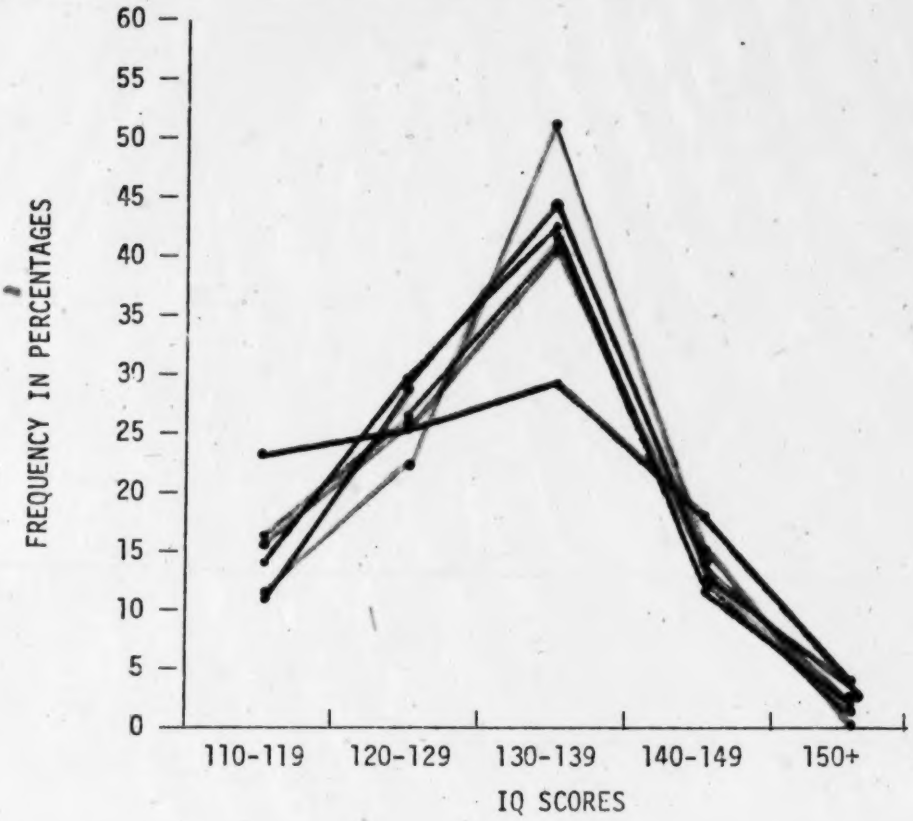
Frequency Distributions

	110-119	120-129	130-139	140-149	150+
ELEMENTARY (n=120)					
Male (n=67)	23.9%	31.3%	26.8%	15.0%	3.0%
Female (n=53)	24.5%	37.8%	24.5%	11.3%	1.9%
JUNIOR HIGH (n=168)					
Male (n=101)	21.7%	37.7%	23.8%	14.8%	2.0%
Female (n=67)	23.2%	31.9%	33.3%	8.7%	2.9%
SENIOR HIGH (n=109)					
Male (n=56)	12.5%	19.6%	35.7%	26.8%	5.4%
Female (n=53)	13.2%	20.7%	39.6%	26.5%	0%

Key to Graph

Figure 5.12

FREQUENCY DISTRIBUTION OF GRADE 6 NON-VERBAL LORGE THORNDIKE ABILITY TEST SCORES FOR ELEMENTARY, JUNIOR HIGH AND SENIOR HIGH COHORTS



Frequency Distributions

	110-119	120-129	130-139	140-149	150+
ELEMENTARY (n=120)					
Male (n=67)	16.4%	26.9%	41.8%	13.4%	1.5%
Female (n=53)	23.5%	25.5%	29.4%	17.7%	3.9%
JUNIOR HIGH (n=168)					
Male (n=101)	15.8%	25.8%	40.6%	14.8%	3.0%
Female (n=67)	10.5%	28.4%	44.8%	13.4%	3.0%
SENIOR HIGH (n=109)					
Male (n=56)	14.3%	28.6%	42.8%	12.5%	1.8%
Female (n=53)	11.4%	22.6%	50.9%	15.1%	0%

Key to Graph

programming on the basis of their grade three Lorge Thorndike ability test scores and, as the analysis showed, for both cohorts the grade six verbal IQ scores were lower than the grade three verbal IQ scores. Approximately fifty-five percent of the elementary males, sixty-two percent of the elementary females, fifty-nine percent of the junior high males and fifty-five percent of the junior high females performed below 130 in their grade six verbal IQ sub-test - percentages which reflected the fact that there were twice as many students - male and female - scoring below 130 in grade six compared to grade three. On the other hand, the senior high school males and females were identified primarily on the basis of their grade six IQ test scores which, as Figures 5.9 and 5.10 demonstrated, were somewhat higher than the elementary and junior high IQ test scores at the grade six level. Their grade three IQ test scores, however, were considerably lower than those of the elementary and junior high males and females in grade three. Did this mean that if identification for gifted programming for senior high males and females had been done prior to grade six, a large proportion of them would not have been included? And similarily, if the elementary and junior high students had been selected on the basis of their grade six IQ test scores, would a large percentage of them have been excluded as well? Given this lack of constancy and elasticity in IQ test scores for the majority of gifted students, to what extent is a fixed 130+ IQ criterion for program entrance justifiable particularly since half of the students in their later IQ achievements obtained scores no longer in the "gifted" IQ range? For several groups - the elementary females, the junior high males and to a lesser extent, the elementary males - IQ scores

for the majority were not maintained within the "gifted" range. Chances are that a fairly large percentage of them would not have been involved in gifted programming if they had been selected at a later stage of their schooling on the basis of their grade six IQ test scores. The elementary girls in particular would have experienced the greatest exclusion since a considerably large proportion scored lower in grade six IQ sub-tests than they did in grade three. Their lower non-verbal achievements (Figure 5.12) relative to those of the other groups is inexplicable. Perhaps some of these girls were merely "early bloomers" or their abilities and talents were contrary to those measured by IQ tests. Perhaps they were more "feminine" in cognitive style and their lower grade six IQ scores were a function of differential modes of cognition. Their particularly low performance relative to that of the superior performance of the senior and junior high gifted girls is indeed curious. It raises the question whether or not a different group of girls may be noticed and/or identified as "gifted" at different levels of schooling? Were the junior and senior high girls identified for programming because they resembled the gifted boys and/or demonstrated intellectual characteristics commonly associated with males? Their fairly equal and/or slightly better performance than their male counterparts in both the verbal and non-verbal ability tests at the grade six and nine level seems to suggest that perhaps only the most exceptionally bright girls were noticed and identified whereas other bright girls, perhaps more typically "feminine", may have been overlooked.

The relativity of identification measures appears to be supported by the various findings in this study. In terms of regular school

performance, standardized test results and ability measures, the junior high girls were consistently superior to the junior high boys yet substantially fewer had been selected for programming. None of the three sets of scores showed a superiority of males to females. It would seem from these findings that other factors are operational in the selection of students for gifted programming which transcend objective measures. Moreover, the lack of constancy in ability profiles for the gifted males and females further demonstrates the relativity of IQ measures and of labels of "giftedness". It would appear that a reassessment of program criteria is in order.

Summary

The major findings within this chapter have been briefly summarized in table format to facilitate quick reference to the respective achievements of the elementary, junior and senior high school gifted males and females.

SUMMARY OF FINDINGS

Regular School Performance

Elementary Cohort	Junior High Cohort	Senior High Cohort
-Sex-typed achievements observed for both males and females at the grade three and six level i) Boys consistently performed better in MA/SC than they did in LA/SS. ii) Girls performed better in LA/SS than they did in MA/SC.	-Sex-Typed achievements observed for males but not consistently for females at both the elementary and junior high grade levels i) Boys consistently performed better in MA/SC than they did in LA/SS. ii) Girls performed equally well in both LA/SS and MA/SC with little or no difference in their LA/SS and MA/SC achievements	-Sex-typed achievements observed for males but not for females although both tended to be relatively equal and consistent performers across all subject areas and all grade levels i) Boys consistently performed better in MA/SC than they did in LA/SS. ii) Girls performed equally well in both LA/SS and MA/SC with little or no difference in their LA/SS and MA/SC achievements.
-Females outperformed boys in LA/SS; Males outperformed girls in MA/SC, however, small cell sizes and small differentials between male and female achievements prevent any conclusive findings.	-Females superior to males consistently performing better in LA/SS and MA/SC at both elementary and junior high school levels.	-Females superior to males consistently performing better in LA/SS and MA/SC at both elementary and junior high levels although differentials between male and female achievements were not large. Only at the high school level were sex-typed effects observed for both males and females with females performing better in LA/SS than in MA/SC and with males performing better in MA/SC than in LA/SS. Also, males performed better than females in MA/SC; females performed better in LA/SS than males.

-Achievement for both males and females was lower in grade six relative to grade three scores.

-Achievement for both males and females was lower in the junior high grades relative to the elementary school grades although boys showed a generally lower performance than girls.

-Achievement for both males females was generally lower in junior high relative to elementary grades but stablized and/or actually increased during junior high school grades. In high school, achievements were generally lower each progressive year for both males and females although changes were not consistently sex-typed for either males or females.

Standardized Test Results

Elementary Cohort

-Sex differences observed in Math achievement but not in reading.
i) boys performed better in math than in reading
ii) boys performed better in math than girls
iii) girls performed better in reading than in Math.
iv) girls performed equally well as boys in reading

Junior High Cohort

-No consistent pattern of achievement for male and female cohorts and no definite sex-typed trends in achievement; both performed equally well in reading and math standardized tests.

Senior High Cohort

-N/A

Ability Test Scores

Elementary Cohort	Junior High Cohort	Senior High Cohort
-No sex differences in verbal or non-verbal test scores at the grade three level.	-No sex differences in verbal or non-verbal test scores at the grade three or six level in terms of mean IQ scores.	-No sex differences* in verbal or non-verbal test scores at the grade three or six level although males tended to be consistently more widely dispersed than the girls.
-Both showed generally lower performance in IQ tests at the grade six level with the verbal sub-test lower than the non-verbal. However, boys showed a slightly better performance than girls in both verbal and non-verbal sub-tests.	-Both showed lower grade six verbal scores relative to grade three verbal scores. However, grade six non-verbal scores were higher than grade six verbal scores, a reversal of the grade three scores.	-Both showed higher IQ test scores in grade six compared to grade three; however, it was the boys who scored higher in the verbal sub-test and the girls who scored higher in the non-verbal sub-test.
-Neither males nor females were consistenly more dispersed than the other.	-No difference in the proportions of males and females distributed in the IQ ability categories at the grade three level. At the grade six level, males were more widely dispersed.	-At the grade nine level, girls showed considerably lower verbal IQ test scores relative to their non-verbal IQ test scores whereas boys showed higher mean scores in both verbal and non-verbal sub-tests.

*There were several small differences between the two groups, both in terms of means and proportions found in the various ability categories but neither they nor the cell sizes were large enough to claim differences in ability.

CHAPTER VI

CONCLUSIONS

This study was designed to examine the achievements of gifted males and females within the Edmonton Public School system. Specifically, it sought to identify and examine the differentials in their patterns of ability and achievement in order to determine whether or not their respective achievements replicated the sex-typed patterns found to exist in general student populations.

A total of 432 elementary, junior and senior high school gifted students ranging from grades six through twelve constituted the sample. Their respective achievement and ability test scores were obtained from Student Cumulative Records in local school files and from E.P.S.B. Tests and Measurement files. Data loss was minimal for the senior high group of students but considerably larger for the elementary and junior high school groups since a large number of schools had neglected to return the student data questionnaires.

Summary of Findings

Analysis of data showed that males have predominated in E.P.S.B. gifted programs although there was a trend towards more equitable male/female ratios at both the elementary and junior high school levels. Male/female ratios at the junior high school level were found to show greater differentials favoring males than were found at the elementary level.

It was also found that during the last two years of gifted programming in which only elementary students were involved, there

tended to be more females than males identified at the grade three/four level but that the reverse was true at the grade five/six level. The more equitable distribution of males and females observed during the last few years appears to be indicative of the changing attitudes regarding the intellectuality of the sexes.

With respect to the SES origin of this group of gifted students, slightly more than two-thirds were of higher SES origin, a finding which was true for each of the three cohorts which were studied. However, there was a trend towards greater participation by students of lower class origin, most notable in the elementary group of students.

Analysis of regular school performance and standardized test scores showed generally superior performance by the aggregate with over three-quarters scoring over eighty percent at the elementary level. This percentage decreased somewhat at the junior and senior high level although there was still a tendency for the majority of gifted students to be scoring upwards of seventy-five percent in both LA/SS and MA/SC. This finding, however, was expected given the identification criteria for gifted programs.

Findings related to the differential patterns of ability and achievement between gifted males and females in the respective cohorts tended to be inconsistent. With the exception of the finding that all males in the elementary, junior and senior high school cohorts tended to perform better in MA/SC relative to their own achievements in LA/SS at all grade levels, there were few other generalizations which could be extended to all groups. What was true for one group was not necessarily true for the other at the same stage of schooling. Not

all females performed better in LA/SS relative to their own performance in MA/SC nor did all female groups perform consistently better than males in LA/SS and/or reading. In fact, certain groups resembled each other more closely in ability and achievement patterns which cut across sex-lines. For example, junior and senior high school females and senior high males appeared to be quite similar in their respective achievements at the elementary and junior high school levels. Their achievements were consistently high, relatively similar and were maintained over the course of their schooling. Their IQ test scores as well tended to remain fairly stable for the largest proportion of students within their numbers although there were small enough differences between these three groups to prevent generalizing that they were similar in all respects. On the other hand, junior high males, elementary males and elementary females, tended to show considerably more sex-typed effects upon their respective achievements and ability patterns than did the other three groups although they too differed from each other in certain respects. It would seem from these results that in aggregate terms, there were few differences between males and females identified for gifted programming since their classroom achievements and ability test scores tended to be relatively similar. Girls showed little difference in their achievements in MA/SC and LA/SS performing equally well in both areas at all grade levels. Boys similarly tended to show relatively equal performance in both LA/SS and MA/SC although at all times their MA/SC was slightly better than their LA/SS performance. The small differentials found between the respective male and female achievements for the three cohorts did not make it possible to state conclusively that there were sex differences

between gifted male and female achievements since the resultant differentials may have been due to the different systems of grading within the system, differential modes of classroom evaluation and/or errors in analysis.

The major findings with respect to regular classroom achievements can be generalized as follows:

(1) Junior and Senior high females tended to be superior overall performers performing equally well in both LA/SS and MA/SC at both the elementary and junior high school levels. For the senior high girls, however, this was no longer true at the high school level. It should be noted that the differentials between the respective achievements of senior high males and females were small at all times and at no time did they exceed four percent - too small a difference to claim sex differences in their achievements.

(2) Gifted males performed better in MA/SC than in LA/SS - a consistent pattern of achievement for all three groups of boys and one which was evident each year that scores were provided. The differentials between male achievements in LA/SS and MA/SC tended to increase as the boys progressed through the grades although none of these differentials were larger than five percent.

(3) Proportionately more males than females scored below eighty percent. This finding was true for all three groups at all grade levels and in all subject areas.

(4) Sex-typed achievements were not found for junior and senior high school females at either the elementary or the junior high school level. Sex-typed effects were evident only in the slightly larger numbers performing in the lowest grade score categories in MA/SC compared to those in the same categories in LA/SS/

In terms of standardized test results, scores were available for

only the junior high and elementary groups. Findings showed inconsistent patterns of achievement between the two groups of males and females. For both groups, no sex differences were found in standardized reading achievements. Better performance by males compared to females in standardized math tests was found for the elementary cohort but not for the junior high school cohort.

With respect to IQ test scores, few sex differences were found which were generalizable to the three cohorts of gifted males and females. The elementary and junior high school cohorts demonstrated fairly similar ability patterns over the years whereas the senior high school cohort demonstrated rather contrary patterns to the other two groups. At the grade three level, males and females within each cohort performed equally well on the verbal IQ sub-test but rather interestingly, the elementary and junior high school females performed slightly better than the males on the non-verbal sub-tests. Senior high males, on the other hand, performed better than the females on the non-verbal sub-test. For all groups, grade three verbal scores were higher than non-verbal scores.

At the grade six level, several changes were observed. For the elementary and junior high school groups of males and females, both the verbal and non-verbal IQ test scores were lower than they had been in grade three. Furthermore, their verbal IQ test scores were now lower than their non-verbal IQ test scores. This was true for both males and females in these cohorts. The senior high males and females, on the other hand, showed the reverse tendency. Not only were their grade six IQ test scores higher than their grade three scores had been but also their verbal IQ test scores were higher than

their non-verbal IQ test scores - a different pattern from that of the other two cohorts. For both senior high males and females, IQ scores tended to be higher each successive grade with their grade three scores the lowest, their grade nine scores the highest. Thus, IQ scores for the senior high group of students tended to increase over time whereas scores for the elementary and junior high groups of students tended to decrease.

As these various findings indicate, the patterns of ability and achievement for this group of gifted males and females were not clear-cut. They were not consistently sex-typed and showed that a large percentage of gifted students were able to rise above the stereotypic sex-typed patterns of ability and achievement - a finding which is consistent with the general research findings regarding the most able and/or creative individuals within society. It is curious though, why the elementary male and female cohorts showed consistent sex-typed achievement patterns in their regular school performance when the other cohorts did not. However, the extent to which similar sex-typed patterns would have been found for this group of students if a larger number of achievement scores had been available is unknown. Further research into the respective achievements of the elementary males and females is therefore required in order to determine whether or not the sex-typed achievement patterns which were found in regular classroom performance would continue throughout their junior and senior high school years of schooling.

The fact that the greatest percentage of girls tended to diverge from the sex-typed achievement and ability patterns found in general populations may also suggest that these girls, when selected for

gifted programming, may have demonstrated achievements and thinking processes normally assumed to be those characteristic of males as demonstrated by their very high non-verbal IQ test scores and their generally superior performance in Math/Science. They may have been the most exceptional and outstanding individuals in their classes and as a consequence, recognized and identified as "gifted" by their teachers. The more traditionally "feminine" girls with somewhat equal ability in the same room but demonstrably less capable and/or talented in the analytic/quantitative subject areas may perhaps have been overlooked by their teachers. The identification procedures thus used, could have served to select only those girls who most closely resembled the boys in abilities and achievements and who were, in fact, superior to the generality of males. Because few sex-typed patterns of ability and achievement were found for this group of gifted males and females and because the analysis showed that each group of females, when selected for gifted programming, outperformed the males in all achievement measures, it is quite possible that this was the case. Not only would they have had to be superior to other females but also to gifted males in order to have been selected for gifted programming. Thus, as suggested previously, it may be easier to be identified as "gifted" if one is male than if one is female.

It is interesting to speculate whether or not these particular gifted females utilized analytic/field-independent modes of cognition, i.e. cognitive styles which are more characteristic of males than females but also more characteristic of higher SES groups. From their IQ test results and their respective achievements in Math/Science, it appears that they were probably field-independent. Also, given the

fact that almost seventy percent of the girls were of higher SES origin, perhaps their relatively equal performance to males in MA/SC and non-verbal IQ tests was more a function of their SES origins and of parental educational background than it was of high ability.

Another finding which raised significant questions regarding the selection procedures of "gifted" students for programming was that approximately half of the gifted males and females achieved IQ scores below 130, i.e. the "non-gifted" range, in the years following their identification as "gifted". To what extent then was the label "gifted" appropriate when in fact, for a large percentage of students, IQ scores were not maintained at the "gifted" level? Were IQ test measurements valid as identifiers of gifted children when IQ scores were not constant during the growth cycle? As Tyler (1974) and Anastasi (1968) indicated, correlations between IQ scores obtained in the early years of schooling and those obtained in the later years were low. The question then arises whether or not school age children should be labelled "gifted" on the basis of outdated and outmoded definitions. It would appear from the findings of this study that the underlying assumptions of the definition of "gifted" demand reassessment and that identification procedures for gifted programming be reconsidered.

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Appendix I

A HISTORICAL PERSPECTIVE OF THE E.P.S.B. GIFTED PROGRAM

Reproduced from A Handbook for Teachers of Elementary Gifted Programs, Edmonton Public School Board, 1977.

A HISTORICAL PERSPECTIVE

Gifted education has had a history of sporadic growth and development in which each renewed surge of interest received its initial impetus from a source external to the educational system. A national threat, a concern for individual differences or a perceived societal need to cultivate the "nation's resources" have all at one time or another spurred educators towards discovering the most able youth and providing educationally for them.

Edmonton's formal interest in gifted programs was first expressed during the sixties - a decade characterized by the civil rights movements and the subsequent concern for individual differences and the need for differential educational programming. At the time, a number of in-school methods were being used throughout the city schools in an attempt to meet the needs of the brighter youngsters but it was felt that they were at best only "band-aid" measures and were not adequately meeting the educational needs of this particular group of students. Consequently, in 1966 a proposal was put forth to the School Board requesting that it consider the implementation of special programming for gifted youngsters and in 1970 the proposal was actualized in the form of a pilot project.

During the subsequent years of operation, the Gifted Program has undergone a number of significant changes which have contributed to its growth and development. These changes are highlighted in the brief discussion of the various phases of development that follows.

PHASE I: RESEARCH AND RECOMMENDATION
1966 - 1967

- a proposal submitted in 1966 to Edmonton Public School Board by a team of administrators and teachers for gifted programming
- proposal precipitated by dissatisfaction with current educational provisions for bright youngsters. These included:
    i) the more able category in the Continuous Progress Plan

cont.

ii) the provision of Elementary Enrichment Kits used in the regular classroom.
iii) the provision of audio-visual equipment and listening centers.
iv) the provision of opportunities for students to do research within their interest areas
v) the availability of special matriculation courses at the high school level
vi) the provision of opportunities for students to obtain high school credits for special individual projects instituted by the province
vii) the provision of high school enrichment courses sponsored jointly by the University and the School Board

- committee commissioned by the Board to research the possibility and availability of gifted programming within the system

- one year later, June 1967 a comprehensive document, Educating Gifted Children, prepared under the chairmanship of Dr. Oliva was presented to the School Board - its major recommendation to implement a gifted program on a pilot project basis

A HISTORICAL PERSPECTIVE

PHASE II: PILOT PROJECT
1970 - 1979

- initiated in September 1970
- three classes established with one at each level (Forest Heights - Elementary, Westminster - Junior High and Victoria Composite - Senior High)
- Fifteen students selected for each of the groups from across the city by Central administrative staff - IQ requirement - 140+
- groups scheduled to meet 2 half days per week at the respective schools
- teachers responsible for developing individual programming to meet needs of the students.
- formal evaluation by the E.P.S.B. Research Department in the Spring of 1973 - its major recommendation: expansion of the program at all levels and incorporation into official special educational services
- terminated in June 1973

A HISTORICAL PERSPECTIVE

PHASE III: GIFTED PROGRAM

SPECIAL EDUCATION DEPARTMENT

1973 - 1976

- 1973/74 the first year as an official Special Education Program
- important changes at that time included:
  - i) the appointment of a half time co-ordinator
  - ii) staff expansion (to the equivalent of 3.5 full time teachers)
  - iii) school expansion - 3 Elementary (Richard Secord, Forest Heights and Inglewood) 2 Junior High (Westminster and Hardisty) and 2 Senior High
- approximately 80 students enrolled in part-time gifted programming
- teachers involved on part-time basis, ie. teacher's instructional time divided between regular and gifted programming

- 1974/75 and 1975/76 gifted programming offered at 6 elementary schools, 4 junior high schools and 4 senior high schools
- classes scheduled on one half-day per week basis for elementary students and two half-days per week for both junior and senior high school students (high schools, in preference to half-day blocks of programming, distributed

cont.

their allotted time into 40 or 80 minute periods and scheduled them into the student's time-table)

- approximately 300 students enrolled in part-time gifted programming
- teachers involved on part-time basis

PHASE IV: GIFTED PROGRAM ELEMENTARY FOCUS

1976 -

- junior and senior high school gifted programs phased out of Special Education, ie. programming decentralized and all individual schools at the two higher levels allowed to offer gifted programming on an option basis (policy made effective September 1, 1976
- focus placed on the development of elementary gifted program
- number of programs doubled at each of the hosting elementary schools and two more schools initiated into gifted programming
- approximately 370 elementary students enrolled
- small multigraded classes of 8 - 10 students
- teaching staff employed as full-time gifted program personnel, ie. teaching responsibilities solely in gifted education

cont.

A HISTORICAL PERSPECTIVE

- common time established in each teacher's timetable for inservice and professional development
- system-wide curricular approach discussed and Handbook for Gifted Program teachers initiated

Appendix II

LETTERS REQUESTING AND

AUTHORIZING THE

RESEARCH STUDY

EDMONTON PUBLIC SCHOOLS
10010 - 107A Avenue, Edmonton, Alberta T5H 0Z8, Telephone (403) 429-5621

May 18, 1978

BOARD OF TRUSTEES

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Deputy Treasurer

Ms. Marian A. Stelmaschuk
Consultant/Teacher
Gifted Program
#312
11135 - 83 Avenue
Edmonton, Alberta T6G 2C6

Dear Marian,

Re: Research Project: "To Identify and Examine the Differentials in the Patterns of Academic Achievement Between Gifted Male and Female Students in EPSB"

The above research request has been approved on a permissive basis following examination by our Department and consultation with Jim Reid, Director Special Education, and Dr. Nick Marchak, Director Pupil Assessment.

You should now directly contact Dr. Marchak's department with respect to obtaining the test data which is available centrally through that branch. Much of the data that you require may not be on the computer and it will be necessary for you to hand-pull the data from the files in the Pupil Assessment Department.

May I take this opportunity to wish you every success with your project and to request that you provide me with a copy of the results of the study as soon as they are available.

Sincerely,

T. Blowers, Ph. D.
Director Research

TAB/ro

CC: Dr. A. Charette
Mr. J. Reid
Dr. N. Marchak

Gifted Program Office
Hazeldean School
June 19, 1978

Dear Dr. Blowers,

Please find enclosed a copy of the letter and student inquiry form which is being sent to various schools within the system to request additional information on the gifted students in my sample. As indicated in the several conversations we have had regarding my research project, the letter and accompanying forms are being sent to those schools having six or less students from the sample being surveyed and those having more than six I am obtaining the information personally by visiting the schools. In this way I am assuming that completing the forms will not be too onerous a task for anyone other than myself.

Your support and encouragement of my project are certainly appreciated as will be your comments and criticisms of the completed analysis.

Sincerely,

Marian Stelmaschuk
Consultant - Gifted Program
Edmonton Public School Board

MS

Enclosures

Appendix III

STUDENT INFORMATION FORMS FOR

ELEMENTARY, JUNIOR AND SENIOR HIGH SCHOOLS

FORM A: ELEMENTARY GRADES

STUDENT INFORMATION FORM

NAME OF STUDENT: _____ MALE: _____ FEMALE: _____
Last First Middle

STUDENT IDENTIFICATION NUMBER: _____ BIRTHDATE: _____

ADDRESS: _____ PHONE: _____

PRESENT SCHOOL: _____ GRADE: _____

FATHER'S OCCUPATION: _____ MOTHER'S OCCUPATION: _____

A. REGULAR SCHOOL PERFORMANCE*

Please record the student's year-end grades in the appropriate spaces.

SUBJECT	GRADE 3	GRADE 6
Language Arts		
Social Studies		
Mathematics		
Science		
Grade Average		
Year		

*If grading system is other than percentages, please give an explanation of the grading system being used.

_____

_____

_____

B. Group Ability Tests

Name	Results	Grade	Date Written
Lorge Thorndike	V:___ NV: ___	3	_____
Lorge Thorndike	V: ___ NV: ___	6	_____
Canadian Cognitive Abilities Test	V: ___ Q: ___ NV: ___	3	_____

Name	Results	Grade	Date Written
(C.C.A.T.)	V: ___ Q: ___ NV: ___	6	

C. Individual Intelligence Tests

Name	Results	Grade	Date Written
Stanford Binet	MA: ___ CA: ___ IQ: ___		
WISC	V: ___ P: ___ FS: ___		
	V: ___ P: ___ FS: ___		
Other: ___	___ ___ ___		
___	___ ___ ___		

D. Standardized Test Results

	Grade 1 Year: ___	Grade 2 Year: ___	Grade 3 Year: ___	Grade 4 Year: ___	Grade 5 Year: ___	Grade 6 Year: ___	Grade 7 Year: ___	Grade 8 Year: ___	Grade 9 Year: ___
a) Stanford Reading Achievement Test (S.A.T.) Word Meaning Paragraph Meaning Comprehension Vocabulary									
b) EPSB Reading Achievement Test Decoding Comprehension									
c) EPSB Mathematics Survey Test									
d) Nelson Reading Test									

	Grade 1 Year: ___	Grade 2 Year: ___	Grade 3 Year: ___	Grade 4 Year: ___	Grade 5 Year: ___	Grade 6 Year: ___	Grade 7 Year: ___	Grade 8 Year: ___	Grade 9 Year: ___
e) Davis Reading Test									
f) Other: _____ _____									

FORM B: JUNIOR AND SENIOR HIGH SCHOOLS

STUDENT INFORMATION FORM

NAME OF STUDENT: _____ MALE: _____ FEMALE: _____
Last First Middle

STUDENT IDENTIFICATION NUMBER: _____ BIRTHDATE: _____

ADDRESS: _____ PHONE: _____

PRESENT SCHOOL: _____ GRADE: _____

FATHER'S OCCUPATION: _____ MOTHER'S OCCUPATION: _____

A. REGULAR SCHOOL PERFORMANCE*

Please record the student's year-end grades in the appropriate spaces.

SUBJECT	GR. 3	GR. 6	GR. 7	GR. 9	GR. 10	GR. 11	GR. 12
Language Arts							
Social Studies							
Mathematics							
Science							
Grade Average							
Year							

*If grading system is other than percentages, please give an explanation of the grading system being used.

_____

_____

_____

B. Group Ability Tests

Name	Results	Grade	Date Written
Lorge Thorndike	V: ____ NV: ____	3	_____
Lorge Thorndike	V: ____ NV: ____	6	_____
Lorge Thorndike	V: ____ NV: ____	9	_____
Lorge Thorndike	V: ____ NV: ____	12	_____

C: Individual Intelligence Tests

Name	Results			Grade	Date Written
Stanford Binet	MA: ____	CA: ____	IQ: ____	____	____
WISC	V: ____	P: ____	FS: ____	____	____
	V: ____	P: ____	FS: ____	____	____
Other: ____	____	____	____	____	____
____	____	____	____	____	____

D: Standardized Test Results

	Grade 1 Year: __	Grade 2 Year: __	Grade 3 Year: __	Grade 4 Year: __	Grade 5 Year: __	Grade 6 Year: __	Grade 7 Year: __	Grade 8 Year: __	Grade 9 Year: __
a) Stanford Reading Achievement Test (S.A.T.) Word Meaning Paragraph Meaning Comprehension Vocabulary									
b) EPSB Reading Achievement Test Decoding Comprehension									
c) EPSB Mathematics Survey Test									
d) Nelson Reading Test									
e) Davis Reading Test									
f) Other: ____ ____									

Appendix IV

CODING GUIDE

Coding Guide

Variable Number	Column Number	Name of Variable	Codes
01	1 - 3	Identification Number of Student	
02	4, 5	Age of Student	
03	6	Sex of Student	0 - Missing 1 - Male 2 - Female
04	7 - 9	Name of School	*See attached sheet for EPSB school codes
05	10, 11	Grade Student Currently Registered	06 thru 12
06	12	Father's Occupation	0 - Missing 1 - Class 1 - Prof. 2 - Class 2 - Management 3 - Class 3 - WC 4 - Class 4 - Low WC 5 - Class 5 - Semi SK 6 - Class 6 - Manual
07	13	Mother's Occupation	0 - Missing 1 - Mother Working 2 - Mother at Home
08	14	Grade 3 Language Arts and Social Studies Regular Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B, B+) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail
09	15	Grade 3 Mathematics and Science Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B, B+, B-) 4 - 60-69 (C, C-, C+) 5 - 50-59 (NS, D) 6 - Fail

Variable Number	Column Number	Name of Variable	Codes
10	16	Grade 6 Language Arts and Social Studies Regular School Performance Scores	0 - Missing 1 - 90+ (H. E. O. A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B-, B+, B) 4 - 60-69 (C+, C, C-) 5 - 50-59 (NS, D) 6 - Fail
11	17	Grade 6 Mathematics and Science Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B, B-, B+) 4 - 60-69 (C+, C, C-) 5 - 50-59 (NS, D) 6 - Fail
12	18	Grade 3 Canadian Lorge Thorndike Ability Scores - Verbal Subtest	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115
13	19	Grade 3 Canadian Lorge Thorndike Ability Test Scores - Non-Verbal Subtest	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115
14	20	Grade 6 Canadian Lorge Thorndike Ability Test Scores - Verbal Subtest	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115

Variable Number	Column Number	Name of Variable	Codes
15	21	Grade 6 Canadian Lorge Thorndike Ability Test Scores - Non-Verbal Subtest	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115
16	22	Grade 3 Standardized Reading Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
17	23	Grade 3 Standardized Mathematics Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
18	24	Grade 4 Standardized Reading Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
19	25	Grade 4 Standardized Mathematics Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
20	26	Grade 5 Standardized Reading Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail

Variable Number	Column Number	Name of Variables	Codes
21	27	Grade 5 Standardized Math Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
22	28	Grade 6 Standardized Reading Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
23	29	Grade 6 Standardized Mathematics Test Scores	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
24	30	Involvement in Gifted Program in the Elementary Grades - Primary Level	0 - Missing 1 - None 2 - Grade 2 3 - Grade 3 4 - Grade 2 and 3
25	31	Involvement in Gifted Program in Elementary Grades - Intermediate Level	0 - Missing 1 - None 2 - Grade 4 3 - Grade 5 4 - Grade 6 5 - Grade 4 and 5 6 - Grade 5 and 6 7 - All grades 8 - Grade 4 and 6
26	32	Involvement in Gifted Programs - Junior High Level	0 - Missing 1 - None 2 - Grade 7 3 - Grade 8 4 - Grade 9 5 - Grade 7 and 8 6 - Grade 8 and 9 7 - All grades (7, 8, 9) 8 - Grade 7 and 9

Variable Number	Column Number	Name of Variable	Codes
27	33	Involvement in Gifted Programs - Senior High School Level	0 - Missing 1 - None 2 - Grade 10 3 - Grade 11 4 - Grade 12 5 - Grades 10 and 11 6 - Grades 11 and 12 7 - All Grades (10, 11, 12)
28	34	Grade 7 Language Arts and Social Studies Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B+, B, B-) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail
29	35	Grade 7 Mathematics and Science Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B+, B, B-) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail
30	36	Grade 8 Language Arts and Social Studies Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B+, B, B-) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail
31	37	Grade 8 Mathematics and Science Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B+, B, B-) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail
32	38	Grade 9 Language Arts and Social Studies Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B+, B, B-) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail

Variable Number	Column Number	Name of Variable	Codes
33	39	Grade 9 Mathematics and Science Regular School Performance Scores	0 - Missing 1 - 90+ (H, E, O, A+) 2 - 80-89 (A, A-, S+) 3 - 70-79 (S, B+, B, B-) 4 - 60-69 (C, C+, C-) 5 - 50-59 (NS, D) 6 - Fail
34	40	Grade 9 Canadian Lorge Thorndike Ability Test Scores - Verbal Subtest	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115
35	41	Grade 9 Canadian Lorge Thorndike Ability Test Scores - Non-Verbal Subtest	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115
36	42	Grade 1 Detroit Beginner's Ability Test Scores	0 - Missing 1 - 150+ 2 - 145-149 3 - 140-144 4 - 135-139 5 - 130-134 6 - 125-129 7 - 120-124 8 - 115-119 9 - Below 115
37	43	Grade 7 Nelson Standardized Reading Test	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail

Variable Number	Column Number	Name of Variable	Codes
38	44	Grade 9 Davis Standardized Reading Test	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
39	45	Number of English and Social Studies Courses Taken in Grade 10	0 - Missing 1 - 1 course 2 - 2 courses 3 - 3 courses 4 - 4 courses
40	46	Average June Grade for Grade 10 Language Arts and Social Studies Courses	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
41	47	Number of Mathematics and Science Courses Taken in Grade 10	0 - Missing 1 - 1 course 2 - 2 courses 3 - 3 courses 4 - 4 courses 5 - 5 courses 6 - 6 courses
42	48	Average June Grade for Grade 10 Mathematics and Science Courses	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
43	49 - 53	Types of Grade 10 options taken	0 - Missing 1 - Courses in Industrial Arts, Mechanics, Automotives 2 - Courses in Business Education, Home Economics, Typing or Shorthand 3 - Courses in Fine Arts, ie. Music, Drama, Art, Visual Communications

Variable Number	Column Number	Name of Variable	Codes
			4 - Courses in Social Sciences, i.e. Law, Anthropology, Sociology, Psychology 5 - Courses in Languages, i.e. French, German
44	54	Number of English and Social Studies courses taken in Grade 11	0 - Missing 1 - 1 course 2 - 2 courses 3 - 3 courses 4 - 4 courses 5 - 5 courses
45	55	Average June Grades for Grade 11 Language Arts and Social Studies Courses	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
46	56	Number of Mathematics and Science Courses Taken in Grade 11	0 - Missing 1 - 1 course 2 - 2 courses 3 - 3 courses 4 - 4 courses 5 - 5 courses 6 - 6 courses
47	57	Average June Grades for Grade 11 Mathematics and Science Courses	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
48	58 - 62	Types of Grade 11 Options Taken	0 - Missing 1 - Courses in Industrial Arts, Automotives, Mechanics 2 - Courses in Business Education, Home Economics, Typing, Shorthand 3 - Courses in Fine Arts, i.e. Music, Art, Drama, Visual Communications

Variable Number	Column Number	Name of Variable	Codes
			4 - Courses in Social Sciences, i.e. Law, Anthropology, Sociology, Psychology 5 - Courses in Languages i.e. French and/or German
49	63	Number of English and Social Studies Courses Taken in Grade 12	0 - Missing 1 - 1 course 2 - 2 courses 3 - 3 courses 4 - 4 courses
50	64	Average June Grade for Grade 12 English and Social Studies Courses	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
51	65	Number of Mathematics and Science Courses Taken in Grade 12	0 - Missing 1 - 1 course 2 - 2 courses 3 - 3 courses 4 - 4 courses 5 - 5 courses 6 - 6 courses
52	66	Average June Grade for Grade 12 Mathematics and Science Courses	0 - Missing 1 - 90+ 2 - 80-89 3 - 70-79 4 - 60-69 5 - 50-59 6 - Fail
53	67 - 71	Types of Grade 12 Options Taken	0 - Missing 1 - Courses in Industrial Arts, Automotives, Mechanics 2 - Courses in Business Education, Home Economics, Typing, Shorthand 3 - Courses in Fine Arts, i.e. Music, Art, Drama, Visual Communication

Variable Number	Column Number	Name of Variable	Codes
			4 - Courses in Social Sciences, ie. Law, Anthropology, Sociology, Psychology 5 - Courses in Languages, i.e. French and/or German
54	72 - 74	Total Number of High School Credits Received	
55	80	Self-Acceleration Status in High School	0 - Missing 1 - Student Accelerating self 2 - Student not Accelerating self

School Codes

ELEMENTARY

100	Abbott
192	Afton
234	Aldergrove
101	Alex Taylor
103	Argyll
104	Athlone
106	Beacon Heights
107	Belgravia
108	Bellvue
109	Belvedere
111	Beverly Heights
226	Brander Gardens
504	Brightview
146	Brookside
225	Caernarvon
113	Calder
237	Callingwood
114	Capilano
193	Clara Tyner
115	Coronation
117	Cromdale
118	Delton
194	Delwood
121	Dovercourt
218	Duggan
233	Ekota
204	Elmwood
215	Evansdale
123	Forest Heights
205	Glendale
184	Glengarry
126	Glenora
127	Gold Bar
220	Grace Martin
178	Greenfield
129	Grovenor
132	Hazeldean
206	High Park
514	Holyrood
240	Homesteader
135	Idylwylde
136	Inglewood
188	J.A. Fife
207	James Gibbons
214	John Barnett
239	Kameyosek
137	Kensington
138	Kildare
180	Lansdowne
141	Lauderdale
224	Lee Ridge
185	Lendrum
242	Lorelei
208	Lynnwood
223	Malcolm Tweddle
186	Malmo
209	Mayfield
143	McArthur
195	McKee
523	McKernan
200	McLeod
148	McQueen
210	Meadowlark
149	Mee-Yah-Noh
150	Mill Creek
151	Montrose
152	Mount Pleasant
153	Mount Royal
154	Newton
155	North Edmonton
191	Northmount
156	Norwood
529	Parkallen
176	Patricia Heights
161	Prince Charles
162	Prince Rupert
187	Princeton
165	Queen Alexanra
165	Queen Mary Park
201	Richard Secord
232	Rideau Park
211	Rio Terrace
168	Riverdale
169	R.J. Scott
196	Rundle
170	Rutherford
235	Satoo
171	Scott Robertson
212	Sherwood
238	Sifton
241	Steinhauer
175	Terrace Heights
216	Thorncliffe
177	Virginia Park
189	Waverly
197	Westbrook
179	Westglen
182	Windsor Park
183	Woodcroft
198	York
213	Youngstown

ELEM/JUNIOR HIGH

500	Allendale
501	Avonmore
112	Braemar
503	Crestwood
505	Donnan
522	D.S. MacKenzie
507	Eastwood
508	Fulton Place
509	Garneau
128	Grandview Heights
511	H.A. Gray
517	King Edward
518	Laurier Heights
520	McCauley
521	McDougall
523	McKernan
527	Oliver
530	Parkdale
531	Parkview
536	Sherbrooke
537	Spruce Avenue
532	Steele Heights
539	Strathearn

JUNIOR HIGH

550	Avalon
502	Balwin
551	Britannia
559	Dickinsfield
561	Edith Rogers
512	Hardisty
513	Highlands
552	Hillcrest
546	Kenilworth
516	Killarney
519	Lawton
534	Londonderry
528	Ottewell
533	Ritchie
538	Riverbend
535	Rosslyn
553	Stratford

557 Vernon Barford
541 Wellington
545 Westlawn
543 Westminster
544 Westmount

SENIOR HIGH

050 Bonnie Doon
051 Eastglen
059 Harry Ainlay
071 Jasper Place
063 M.E. LaZerte
058 McNally
052 Queen Elizabeth
053 Ross Sheppard
066 Scona (Old)
054 Strathcona
055 Victoria

950 Completed Grade 12 at Bonnie Doon
951 Completed Grade 12 at Eastglen
959 Completed Grade 12 at Harry Ainlay
971 Completed Grade 12 at Jasper Place
963 Completed Grade 12 at M.E. LaZerte
958 Completed Grade 12 at McNally
953 Completed Grade 12 at Ross Sheppard
966 Completed Grade 12 at Old Scona
954 Completed Grade 12 at Strathcona
955 Completed Grade 12 at Victoria